

MODERN

May, 1942

# Machine Shop

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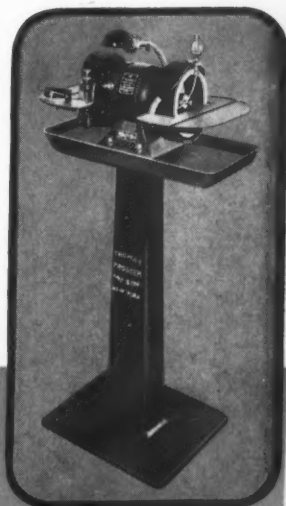
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# MODERN Machine Shop

MAY, 1942  
VOLUME 14 • NUMBER 12

# Contents

HOWARD CAMPBELL, Editor

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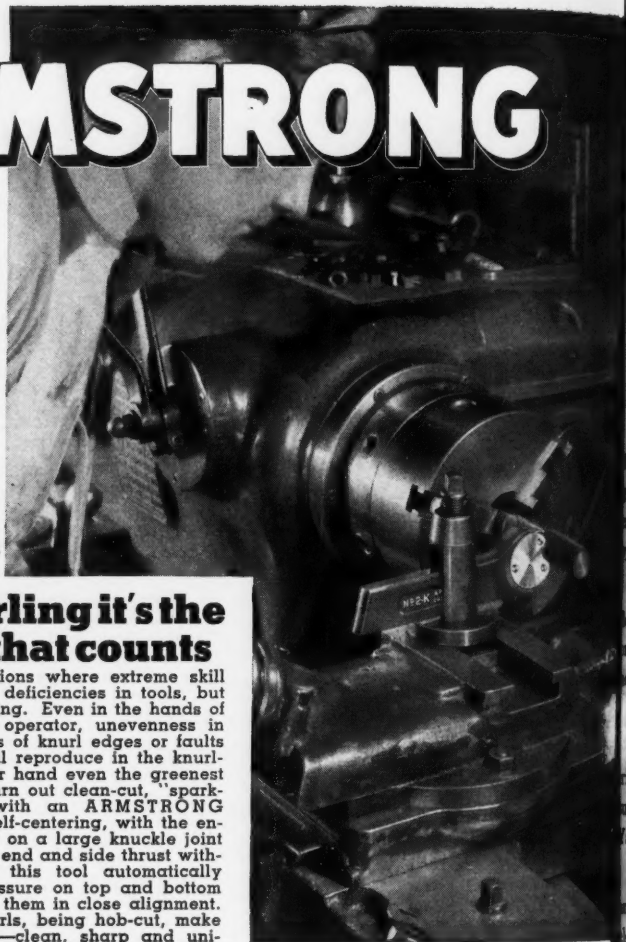
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# ARMSTRONG



## In Knurling it's the TOOL that counts

There are operations where extreme skill can make up for deficiencies in tools, but not so with knurling. Even in the hands of the most skilled operator, unevenness in pressure, dullness of knurl edges or faults in the pattern will reproduce in the knurling. On the other hand even the greenest apprentice will turn out clean-cut, "sparkling" knurling with an ARMSTRONG Knurling Tool. Self-centering, with the entire head bearing on a large knuckle joint that absorbs both end and side thrust without "springing," this tool automatically equalizes the pressure on top and bottom knurls, and holds them in close alignment. ARMSTRONG Knurls, being hob-cut, make a perfect pattern—clean, sharp and uniform. Coming in Coarse, Medium and Fine in both Diamond and Straight patterns, they are machined from high carbon steel, heat treated, tempered and tested. If your knurling is mediocre, correct it now by calling your nearest supply house for ARMSTRONG Knurling Tools and ARMSTRONG Hob-cut Knurls.



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# MODERN Machine Shop

CINCINNATI, OHIO

MAY, 1942

VOL. 14, No. 12

## We Present ---

—as the feature article in this issue—the story of the “Ugly Ducklings”; the steel ship that has been developed to meet the needs of the present emergency. The interesting part of the story is, of course, the high speed methods employed to turn out ships at a higher rate of speed than they can be sunk by Hitler, Hirohito and Company.

—on page 116—some suggestions which may save any manufacturer many dollars on power transmission equipment. With belting available only on priorities, it behooves every plant manager to conserve materials—and of these not the least is leather belting. And this is practical stuff.

—as our next feature a short article telling the story of the development and operation of a jobbing machine shop which serves a wide range of industries in a country which is still in the middle stages of development. We are sure you will agree, after reading this article, that a Mexican mechanic and a Yankee machine tool makes a good combination.

—on page 146—some pertinent information on the saving that can be made and the increase in production that can be obtained by using the proper size electrodes in welding. This also is worth reading.

—several interesting and useful ideas in the section under the heading “Modern Equipment at Work.” The “Ideas from Readers” department also contains the usual assortment of “kinks” and “short-cuts.”

Inasmuch as some 10 days elapses between the time our first form goes to press and the time the completed magazine goes into the mail it is quite evident that the editor could make some comments on his page which might be nullified by events in the next 10 days. Accordingly, the editor has moved his page to the back of the book where, after all of the writers and authors have presented their material, he has “The Last Word.”

May, 1942

MODERN MACHINE SHOP 107

# Ugly Ducklings-- Hatched by Conversion

*To beat the enemy we must have ships—and Uncle Sam will soon be turning big steel vessels out at a rate of two a day. This article tells how it is done*

**T**HE term Ugly Duckling is a misnomer for a merchant vessel built at top speed in a race to put more freighters to sea than the enemy can sink. In World War I they were ugly indeed, and very few were sunk, because hastily-constructed shipyards got into production too late. Most were launched after the Armistice, the majority in 1920.

But in this war, plant conversion

and assembly line methods make sleek, one-funnel job, 441 feet long and 57 feet wide through the beam, and they make it quickly. Ugly Ducklings pour out of inland and coastal plants in prefabricated assemblies at the rate of one a day. Before the year is out, two a day will be splashing from the ways.

To make an Ugly Duckling, during 3200 tons of steel plates, girders,

bars, angles and channels at one end of a prefabricated each replicating plant a freight Haul the stuff by the plant overhead crane each to down a production place in a tion line to be cut. But first bored, punched this. However sized, shaped and shipyards welded. The hour's work last war. breaking launching But now coastal factories be described elapse between extract and Because likely targets, the story may fore it was



Two "Ugly Ducklings" of the Liberty Fleet Lying at anchor in the Basin of a Large Eastern Shipyard Awaiting Final Fitting and Rigging

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only 11 months

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a Duckling.

Because it is

near the coast and

a likely target

for bombers or

saboteurs, the

name and site

of this factory

may not be

mentioned; but,

before it was



This Mass of Rolling Cranes at a Large Eastern Shipyard is typical of many Shipyards now at Work on Ships for Uncle Sam's Navy and Merchant Fleet. Stocks of Materials Piled Adjacent to the Ways are Moved to the Vessels under Construction by the Cranes, Precluding Delay. All Parts are Pre-Fabricated in a Huge Plant where Once Freight Cars were Built

each resulting sub-assembly on a freight train at the other end of the plant and send it down to the sea, each to be welded or riveted into place in a building ship.

But first get a factory that can do this. Hog Island and its kindred shipyards had to be built before an hour's work began on ships in the last war. The shortest span between breaking ground for a shipyard and launching a vessel was 16 months.

But now, by converting inland and coastal factories—such as the one to be described here—only 11 months elapse between awarding of the contract and christening a Duckling.

Because it is near the coast and a likely target for bombers or saboteurs, the name and site of this factory may not be mentioned; but, before it was abandoned to a maintenance

crew several years ago, it turned out freight cars. Leased in March of 1941, the plant was converted quickly and began work before June. With a nearby shipyard to assemble its bits and pieces, it turned out its first ship before Christmas—a record. Now it is making one a week, and before long will hatch one every 3½ days.

All in all, this plant and its shipyard surpass 1918's Hog Island. They have more speed and less noise. Welders have replaced most of the riveters of 24 years ago, who hammered out as much racket as our guns then banging at the Hindenburg line. In 1941 and 1942, sound effects are muted.

When ship builders took over this plant last April, they cleaned house and moved machinery around to





function like a stream-lined auto plant. There was room to do it. The old car plant is 270 feet wide, and 1,620 long—the largest cargo ship shop in America.

By putting in new dies and cutting edges for tools already in the plant, it was possible to convert most of the machinery that had made freight cars to the making of freighters. A 30 per cent increase in installations was needed, but most of them were second hand.

Adolf Schicklegruber may be interested to learn that one of the largest additions to the plant was designed in Germany. It is a plate roller so big it looks like four coast defense guns employed as a wringer.

no buyer until the freight car shop was converted. Then it sold for \$45,000—a bargain. It would take a year to replace the great machine.

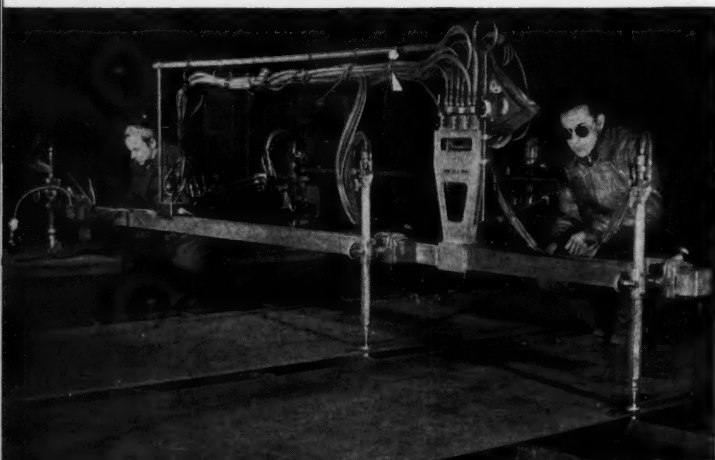
This roller, busy night and day, shapes 420 plates a week for the sides of ships. It is temperamental. It needs care and nursing. Without proper direction, the plates it bends would fit a ship as loosely as the petals of an artichoke. It is a one-man critter, and its master is Albert Alms, who, as a young machinist, helped build this wonderful wringer, learned to operate it, then made it his career. He has been with it ever since. When it was called into service last March, Alms directed its installation, taught a new crew to run

Laying Out Steel Ship Plates from Wood Patterns. The Patterns Indicate Rivet Hole Locations or Other Necessary Information

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Built in Chicago in 1919-1920, at a cost of \$180,000, it was used by United States Steel until 1937, then went to a used - machinery dealer who found

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Cutting Two Identical Steel Floor Plates with a Travelling Oxy-Acetylene Cutting Machine. A Stylus Follows the Outline of a Pattern and Guides the Movement of the Cutting Torches so that Duplicate Pieces are Produced

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After the Plate Sections have been Cut, They are Marked According to Location in the Assembly and then are Sent to the Erecting Floor where They are Welded into Sub-Assemblies as Shown Here. The Sub-Assemblies are Shipped by Flat-Car—30 Cars at a time—to the Shipyard where They Become Parts of Ocean Steamships

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it, and stood by to direct their work. The largest installations for the converted plant were the furnaces, where heavier work, such as the rubs of the ship boss, the bilge, stem, stern, and thick keel plates, are softened up for shaping in 3,000 degrees Fahrenheit. Hauled out on a steel floor perforated with squares like a waffle iron, the red hot steel is shaped by crews operating hydraulic presses called pushers and rams. These bend and shape the metal against steel molds or a pattern of metal pegs driven into the floor—a case of round pegs making good in square holes.

Each of a ship's 400 side plates has



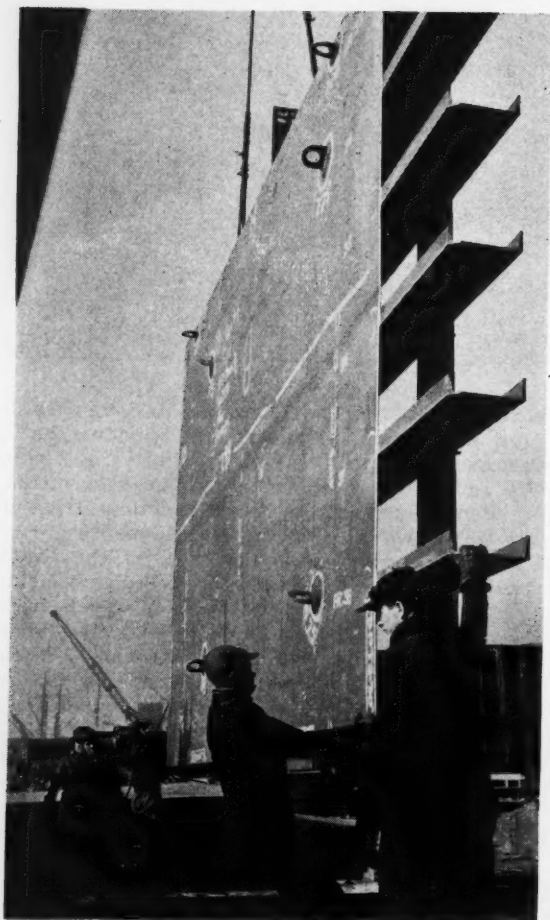
a shape and size of its own. Each takes a pattern as individual as a piece in a crazy quilt. These patterns, known as templates or molds, are made of paper and thin strips of wood. Designers work months fashioning these dummies to the exact shapes and dimensions. Symbols indicate rivet holes, cuts, bevels, sections to be reinforced, and the plate's definite position on the ship. When these marks are transferred to the metal in colored hieroglyphics by workmen flourishing long-handled paint brushes, each steel sheet looks like a gigantic Chinese laundry slip.

So painted, the plates, dangling from overhead cranes, sail down the

Here a Giant Plate Roller of German Design is being Used to Roll Cold Steel Shell Plates for Assembly into an "Ugly Duckling." Each of the 400 Side Plates that go into a Steel Ship is of Individual Size and Shape—and this Machine Shapes 420 Plates a Week

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Here a Huge Prefabricated Section is Being Swung into Position in a Partly-Assembled Steel Ship. Prefabrication of these Sections and Sub-Assemblies in a nearby Plant saves Weeks of Time in the Building of Ships for Uncle Sam's new Merchant Fleet. Welding, Which is Used wherever Possible in the Fabrication Process, not only saves Time and Steel, Makes an "Ugly Duckling" from 10 to 15 Per Cent Lighter than the Ugly Duckling of 1918

the plate swings out the other end of the plant through hanger-like doors for welding into sub-assemblies — 22-ton double-bottom sections, for example, 22 by 29 feet and 4 feet thick. Two such sections span the breadth of a standardized boat.

Flatcars tote the sub-assemblies 30 cars at a time to the shipyard where they are hoisted up, over and fastened in place. Most are joined together by welders; some are pinned together by riveters. Respective sub-assemblies are interchangeable in this day of mass production. Parts of one ship fit another like

parts of automobiles.

It takes 2,550 tons of girders and plates, 55,000 rivets and 194,000 linear feet of welding to put an Ugly Duckling into floating condition. Once off the ways, it then gets its engine and deck fittings. Welding, which saves time, steel, and weight, makes a Duckling from 10 to 15 per cent lighter and much stronger and gives it sweeter lines than the really ugly Ugly Duckling of 1918, which had 900,000 rivet bumps. Consider

production line. Safety crews escort them to the ringing of warning bells, so that no workman gets clipped on the head. At all times at least 50 tons of steel—parts of 22 ships—are swinging through the factory.

Each plate stops at the machines that will process it. If it requires rivets, it goes through presses that punch holes as though through cheese. If it is too large, it is cut to pattern by machine shears, planers and hand torches. Once processed,

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the saving of 845,000 rivets and 2,780,000 rivet holes for each boat.

Although it requires more skill to put a ship together today than it did 24 years ago, more than 85 per cent of the 2000 employees at the plant alone started from scratch, when work began last spring. These inlanders—98 per cent native Americans from plantations, steel mills and coal mines—had never seen an ocean-going ship, let alone a shipyard. Classes have taught trades to most of the 8000 employees at work now. In less than a year industrial education has made them skilled erectors, fitters, reamers, drillers, welders, riveters, burners, and caulkers. Except for those experienced

foremen and leadmen assigned from other shipyards, employees are enlisted at the gate.

There is another type of men, however, at both plant and shipyard—Government officials who never seem to sleep or eat. By day and by night they putter among stock piles, climb about unfinished ships, or contemplate welding jobs or rivetings. They are Maritime Commission inspectors, looking for errors in workmanship and placing their years of practical experience at the disposal of the contractor's organization to the end that production may be speeded.

A mistake in the mold loft, where patterns are made; an incorrect marking on a girder, or a hole

Welding a Foundation for Steel Pillars to Support the Fecks above the Propeller Shaft Tunnel. It takes 2,550 Tons of Steel Plates and Girders, 55,000 Rivets, and 194,000 Linear Feet of Welding to Put an Ugly Duckling into Condition to Float





As Fast as a Vessel is Moved off the Ways, the Keel is Laid for Another. Here the Keel Has Been Laid and the Bottom and Side Shell Plating and Inner Tank Sections are Being Assembled

burned in the wrong plate might cause a disaster, or, more probably, entail expensive delays. But there are few errors and few delays; this

converted plant works as though built for no other job.

(Photographs Released by Office for Emergency Management.)

"Grits and Grinds," Vol. 33, No. 2. The feature of this particular edition of "Grits and Grinds" is a helpful profusely illustrated and descriptive article on the truing and dressing of grinding wheels. Also included in the booklet are Nos. 2 and 3 of a series of cartoons containing helpful hints on grinding, an item on the regrinding of pipe wrenches, and another item illustrating and describing a small increment down-feed for 6 x 18-inch surface grinder.

Copy of "Grits and Grinds," Vol. 33, No. 2 can be obtained free of charge by writing to the Norton Company, Worcester, Massachusetts.

"Electric Gaging," a 12-page booklet issued by the General Electric Company, Schenectady, N. Y., discusses in an interesting and concise manner 11 outstanding instances where savings in both time and material and at the same time improved quality have resulted from the application of extremely sensitive yet sturdy electric gaging equipment. The booklet illustrates such electric gages as the strain gage, pressure gage, film-thickness gage, eccentricity gage, profile gage, electrostatic gage, and the tensiometer. Applications for each are also suggested. Copies of Booklet GES-2542 free upon request.





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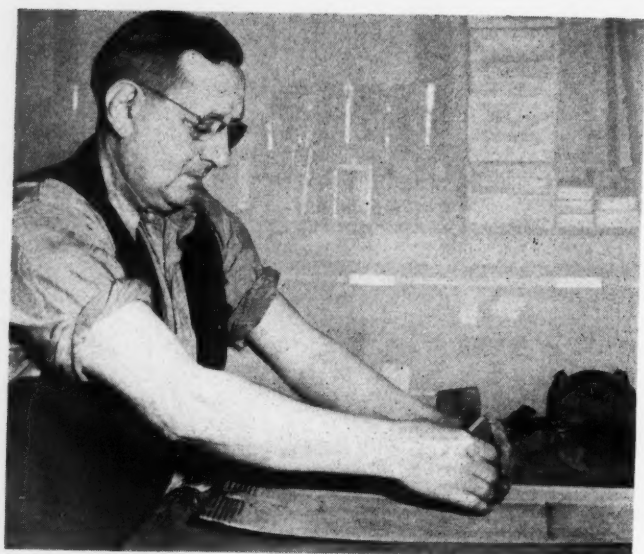


Fig. 1—Old Glue Is Removed by Scraping with a Hand Scraper

By

LADISLAW REDAY

# Salvage Your Discarded Leather Belting

**A**LMOST every metal-working plant has, somewhere, a pile of discarded leather belting into which the millwright delves at intervals for a piece of leather that can be used to make a washer or a stop or to repair some device in which leather is used. Periodically the pile is burned or sent to the refuse dump.

In these days when new belting is on the priority list, deliveries are slow, and red tape is even slower, a supply of reclaimed belting might mean the difference between a few minutes down-time on a machine or several days delay due to the lack of a belt. If this old belting can be reclaimed inexpensively; perhaps when

the maintenance men are not engaged on more important work, it may prove a boon on defense production jobs.

The old belting pile usually consists of:

(1) Belts that have been discarded without being worn out, because of machine, engine, or drive replacement.

(2) Double-ply belts with worn inner plies but with outer plies still in good shape.

(3) Belts each of which has one or two bad spots but with a portion of the belt curled up where it has run in contact with some object adjacent to the pulley.

(4) S...  
nants.

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(1) Ce... Leather

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Fig. 2—Fe... Part the Ki... the Split, ... Through, K... Edge in C... the Strai...

(4) Short ends, odd sizes, and remnants.

It has been the writer's experience that probably three-quarters of all discarded belting has salvage value, and that it can be rebuilt at less than one-quarter of the cost of new leather belting. And this can be done simply, with no more tools than a leather scraper, a pot of glue, and a splitting gauge. Even these tools can be improvised by any good toolmaker or inventive machinist.

The rebuilding will deal largely with double ply belting, inasmuch as most piles of discarded belting will be found to consist mainly of doubles. There are three methods of rebuilding double belts in general use, with proponents of each, and all designed to replace the worn inner ply of leather. Briefly, their characteristics are as follows:

(1) Cementing a New Ply of Leather to Old Reaming Ply.

Although this method is practiced extensively on such drives as wide-belt engine drives, it seems inadvisable for a general rebuilding program. First, the new ply is bound to outwear the old ply, and the shop is faced with the same problem all over again. Second, the stretch in the new ply will be greater than in the old leather, and as the new leather elongates,

most of the load will be thrown onto the old ply and in consequence its life will be short. Third, new leather is costly, making this process uneconomical except in the case of large or three-ply belts where the investment is considerable.

(2) Cementing Fabric Back to Old Leather Ply.

This method is better, from a standpoint of potential stretch, because the fabric (canvas or duck) has but little stretch—no more, certainly, than the old leather ply. But here again the fabric will outlast the old leather and part of the investment will be wasted. Only one side of this belt can be used to contact the pulley without considerable loss of pulling power. Because of the difficulty of cementing the fabric to the leather, it is suggested that the shop allow one of the several companies, that are equipped for the job to do this work.

(3) The most logical course seems to be to cement together the two good plies taken from two old double belts, discarding the two worn inner



Fig. 2—Feed the Belt Past the Knife to Start the Split, then Pull It Through, Keeping one Edge in Contact with the Straight Edge.

plies. Thus none but old leather will be used, and the cost of rebuilding the belting will be reduced. The potential stretch in the two plies must necessarily be equal, so that the life of the two plies will be the same. This method will yield one-half the amount of footage that was contained in the discarded pile before reclamation was started. The only new material used is the glue. The major belting firms will do the rebuilding, or it can easily be done by any good millwright.

The general procedure to be followed is divided into four operations: (a) cleaning, (b) cutting and splitting, (c) regluing and joining, and (d) trimming.

**Cleaning.** Leather belting can be cleaned and the surplus oil removed by washing in any one of several cleaning agents such as gasoline, naphtha, kerosene, benzol, carbon tetrachloride, aqua ammonia, alcohol, soda, and water. To wash a leather belt, immerse the loosely-wound coil on edge in the liquid and allow it to stand over night, then reverse it and let it stand on the other edge for ten hours.

The dirt on the belt will loosen and usually will settle to the bottom of the container. The dirt that does not detach and settle can be removed by brushing or scraping. To hasten drying, the belt may be run through an ordinary washing wringer, provided the belt is not too wide. After the belt has dried sufficiently, it should be lubricated with a suitable dressing.

When using gasoline or naphtha, it is necessary to be very careful. If gasoline is allowed to stand in an open container, such as a bucket or pail, the surrounding atmosphere will soon be filled with an easily explosive mixture. Only a little gasoline vapor is needed to render air explosive;  $1\frac{1}{2}$  cubic feet of gasoline vapor for each  $97\frac{1}{2}$  cubic feet of air.

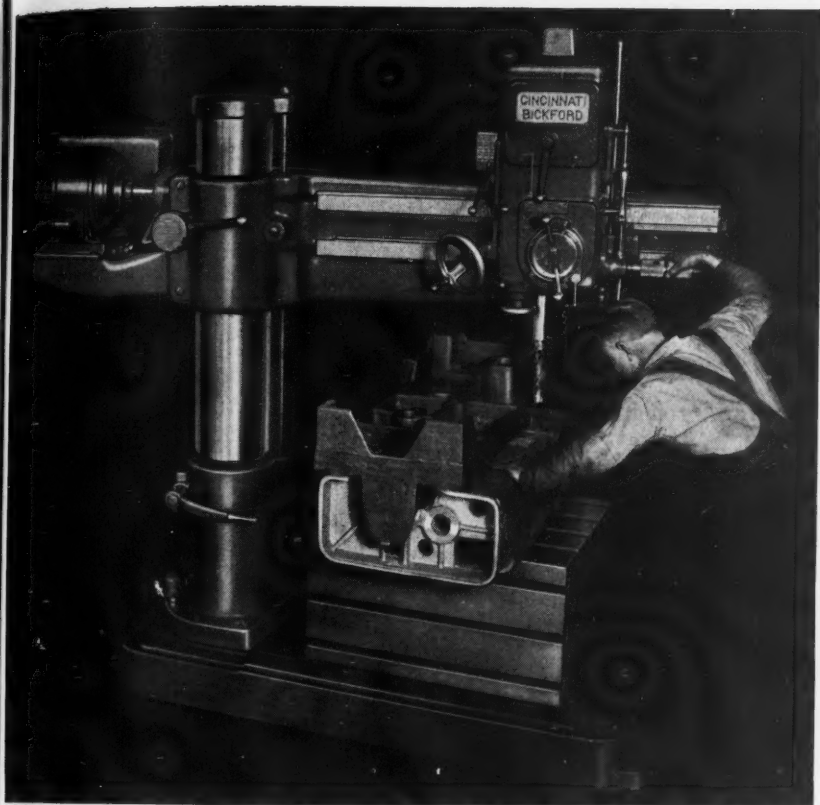
Do not allow the belting to remain in the gasoline or carbon tetrachloride too long; excess use of the cleaning materials will extract the greases and oils that have been put into the leather by the tanner to keep the belt soft and pliable. Without these oils, the belt will become stiff and then will crack easily. These essential oils cannot be replaced in the grain or hair side of the belt after they have been removed.

Twelve hours, or overnight, is usually the maximum of allowable immersion. If the surface of the belt is grayish white upon removing it from the bath for inspection, the degreasing has gone far enough. Excess oil can also be removed from leather belting by packing the belt in sawdust. This procedure takes somewhat longer, however, and may take several days. After cleaning, the old glue must be removed by scraping as shown in Fig. 1.

**Cutting and Splitting.** Cut out sections containing all the bad spots in the old belting; where the grain has cracked badly, or where the belt is crooked, or where the edge has been turned off by running against a pulley rim or against some adjacent object. Be ruthless about cutting away; remember that the belt was all waste anyway, and there is no point in spending money to rework a doubtful piece of leather. Some of the pruning can be done before the belt is cleaned, but much of the belt will need to be cleaned before a decision can be made as to its usability.

To separate the plies of double belting, open one end (the end toward which the laps point) with a screwdriver for a distance of about a foot. Clamp one ply of the opened end in a vise and pull the other ply loose. If the plies do not separate easily, drive into the "V" of the split with a cross pien or chisel-head hammer. Match the good ply from one belt with the good ply from another.

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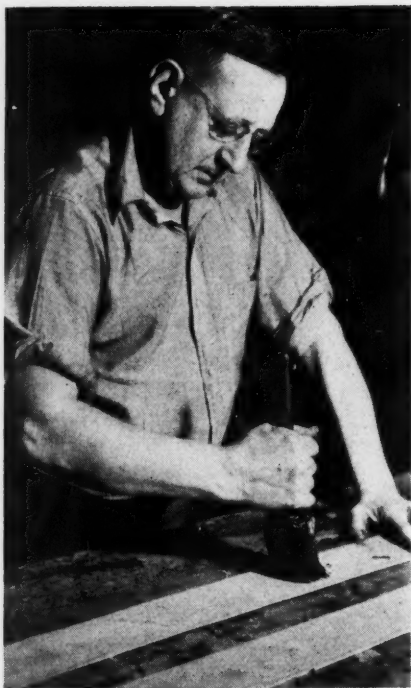


Fig. 3—The Contacting Surfaces of the Plies are Brushed with Glue, then the Glued Surfaces are Quickly Placed Together

Decide on two or three popular widths of belting to run into rolls. Split all the discarded belting down to these sizes. Allow one-half inch on the double ply belting for trimming. In other words, all belting will finish one-half inch narrower than its original size. Splitting is done by pulling the belt past a knife held vertically so that the belt will be cut to the desired width. A splitting gauge is shown in Fig. 2.

As can be seen from the illustration, the splitting gauge consists primarily of a flat, heavy table to one edge of which a straight edge is anchored. At one end of the table is a clamp carrying a knife blade, held in vertical position and parallel to the straight edge, with the cutting

edge of the blade facing the table. The knife and its mechanisms can be purchased, or one can be improvised without much trouble.

When a belt is to be split, the knife is located at an exact distance from the straight edge which will equal the width to which the belt is to be cut. The belt is then so placed that it can be pulled lengthwise of the table and parallel to the straight edge, with one edge of the belt in contact with the straight edge.

To start splitting, cut into the end of the belt at the desired width with a hand knife or with the splitting gauge knife. Then lay the end of the belt flat on the table and slide the end of the belt past the knife, with the knife in the split. Then grasp the ends either side of the split, as shown in Fig. 2, and pull the belt through by hand until the job is completed, keeping one edge of the belt always in contact with the straight edge so that the cut will be straight.

Belts more than eight inches in width should be cut according to a definite plan, because belts of that width and over are cut from the center of the hides with the part that lay directly over the backbone—the thickest part of the hide—running through the middle. This "backbone" helps to keep the belt running straight when it is in the center of the belt. Thus a belt split so that the backbone is off-center would have a tendency to run crookedly. Such would be the case, for example, where an eight-inch belt had been cut into five-inch and three-inch belts.

In reducing the width of a belt by splitting some off, the belt must be split equally from each side. Thus the eight-inch belt could be split into two three-inch belts and one two-inch belt, the two-inch belt to contain the backbone. Or a two-inch belt could be split from each side,

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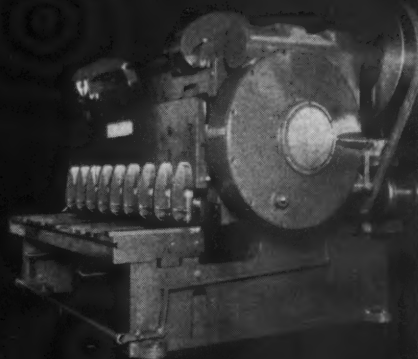


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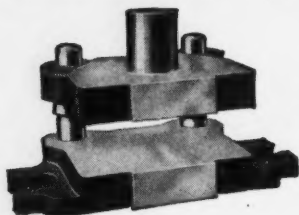


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leaving a four-inch belt containing the backbone. But the backbone must always be the center of the belt in which it is included.

**Regluing and Joining.** Before the belt sections can be joined together at the ends the double belt plies must be glued together. It is suggested that the so-called hot, or animal, glue be used. While this glue is not waterproof, it is comparatively easy



Fig. 4—Using the Back of the Scraper, the Belt is "Ironed" to Eliminate any Air Pockets that Might Remain

to apply and therefore is preferable. For one thing, the use of animal glue does not require a press.

Using a brush, as shown in Fig. 3, the hot glue is applied to one ply and then the other, then the glued surfaces of the two plies are quickly placed together. With the belt lying flat on the table, the back of a scraper is used to iron out the air pockets as shown in Fig. 4, then the belt is tapped lightly all over with a hammer for a few minutes, or until the glue sets. Allow about three

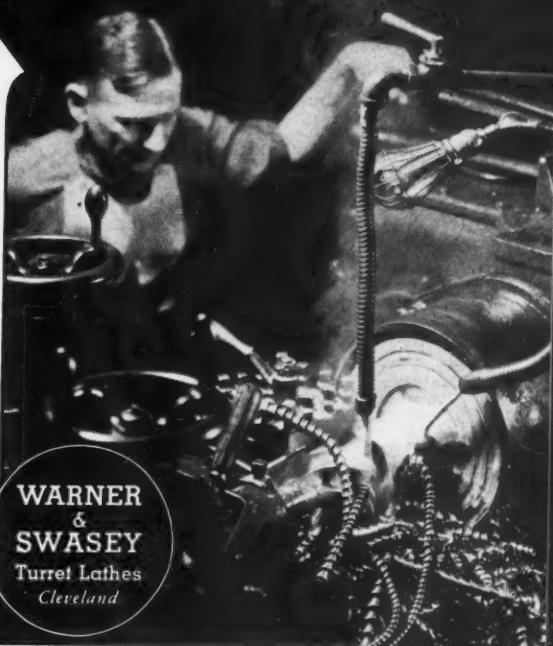
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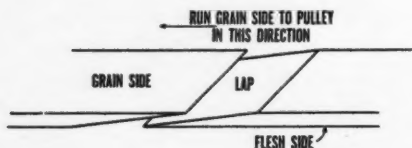


Fig. 5—To Splice Single-Ply Belting, Bevel the Contacting Ends As Shown, Roughen the Surfaces, and Glue

ing have been glued together, the sections should be joined end to end so that belting of the length necessary will be available when it is needed. For single ply belting this is simple; just bevel the ends to points, or "laps," roughen the contacting surfaces a bit, and glue them together as described above. For belts that are more than six inches wide, however, the bevel or "lap"

should be at least six inches long; for narrower belts the lap should be four inches long. The manner of beveling is illustrated in Fig. 5.

To splice double ply belts a dovetail joint such as that shown in Fig. 6 is made. For belts under five inches in width the laps should be eight inches long and for belts as wide as 12 inches or wider the laps should be approximately 12 inches long. Shorter laps develop trouble in flexing over small pulleys. In ap-

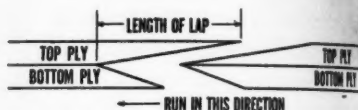
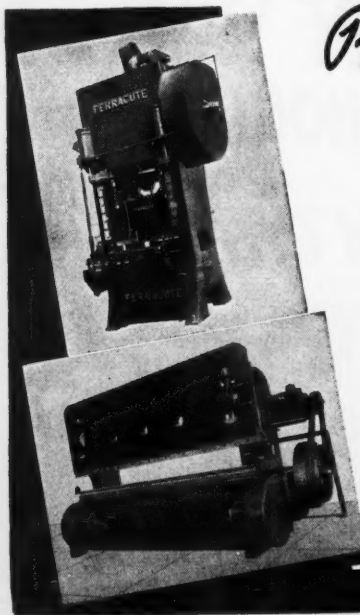


Fig. 6—To Splice Double-Ply Belts, a Dovetail Joint is Prepared

plying the glue it is better to glue a small amount at a time rather than the whole lap at once.



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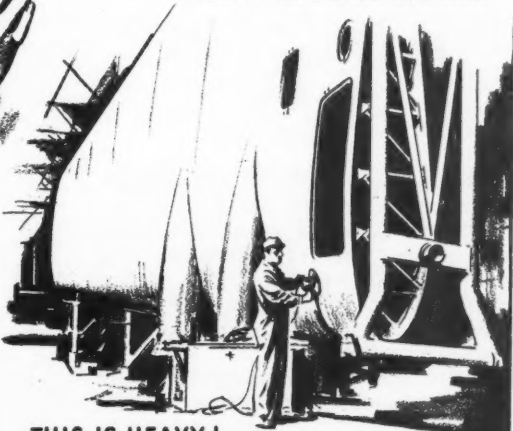
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The ends are beveled, in most cases, by planing down the ends to a rough slope. The final bevel is produced with the belt scraper, the scraper being grasped in both hands and scraped against the lap until a feather edge is produced. The laps are then roughened and glued as before.

**Trimming.** With the plies glued together and joined into long lengths or rolls, it is advisable to run the belt through the splitting gauge and trim off approximately  $\frac{1}{4}$  inch on each edge. This operation cuts off the surplus glue and evens up the worn places, as well as to straighten

the belt for smooth running.

With the application of a light belt dressing or a mixture of equal parts of neatsfoot oil and tallow the plant now has an additional stock of leather belting, at a cost of less than one-fourth the cost of new belting. If the work has been done in the millwright's spare time, the cost has been practically nothing. The most important item is that an additional supply of belting will be made available at a time when every machine must be kept running and every ounce of useable equipment must be conserved.

(Illustrations Courtesy Graton & Knight)

## Police Inspector Suggests Three Ways to Halt Sabotage

By JOHN WINTERS FLEMING

**F**IRMLY convinced that the gravest responsibility for halting defense sabotage rests squarely upon the defense workers themselves, Police Inspector Peter J. Flood of the Buffalo Police Department gives defense workers a simple three-point program. Here it is:

1. Do not talk to anyone about your work except fellow employees in whom you have absolute confidence.

2. Beware of strangers both outside and inside your plant. Be particularly suspicious of anyone who asks questions.

3. If you become suspicious of a stranger in your plant, take him to your plant police or city police. Don't let him out of your sight until you do this.

Special Agent A. C. Schlenker of the Buffalo office of the Federal Bureau of Investigation, in addressing members of the Empire Chapter, In-

ternational Association of Electrical Inspectors, adds:

"You men are better trained than most persons to detect attempts at sabotage. Anything that to you appears suspicious should be brought to our attention. We would rather you came to us with 1,000 complaints, no matter how seemingly unimportant, than to let one significant thing go by."

**"Don't Abuse Rubber—How to Prolong Its Life."** Mimeographed reprint of the text of an article on the subject "Don't Abuse Rubber—How to Prolong Its Life" are now available upon request to The B. F. Goodrich Co., Akron, Ohio. The article, the author of which is William S. Richardson, General Manager, Industrial Products Sales Division, is designed to aid industrial managers in their efforts to conserve rubber products.

Following a general discussion of the present rubber scarcity and restrictions, due to the war, and some general rules on how to prolong the life of all rubber products, the article includes chapters on water hose, fire hose, air hose, steam hose, hose couplings, tire conveyor belts, V-belts, rubberized clothing, mats and matting, rubber lined tanks, and other equipment. Each subject is broken down and treated separately for easy reading.

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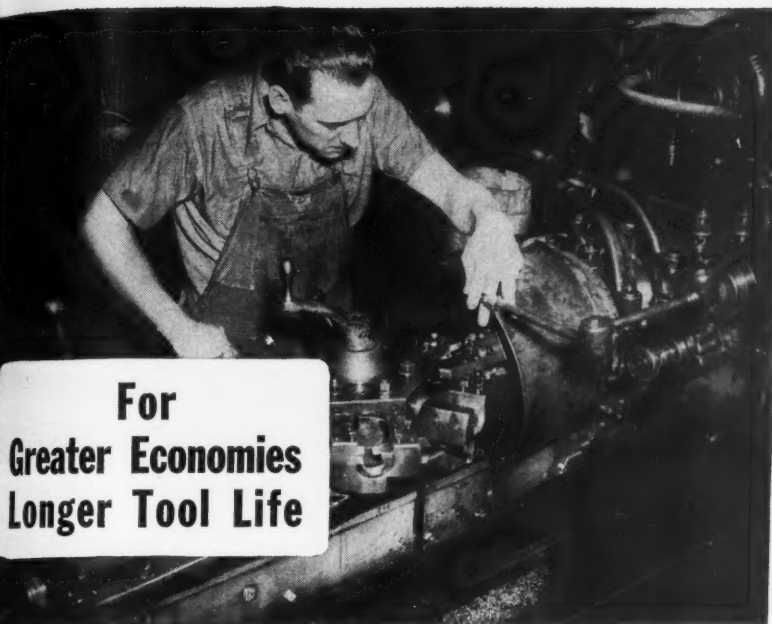
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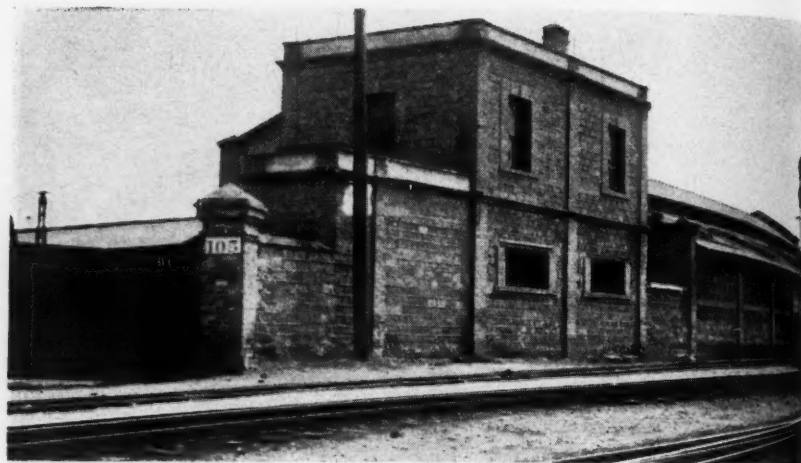
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The Railroad Gate at the Toolroom and Warehouse of the National Iron & Steel Works in Mexico City

# A Mexican Machine Shop

*In which the author discusses some of the problems that are met in the operation of a machine shop "south of the Rio Grande"*

By FRANK GIBLER

**A**MONG the pioneer railroad builders who built the first railroads in Mexico was one Frank W. Johnstone, who became Superintendent of Motive Power of the Mexican Central Railway and later, in 1898, founded the National Iron and Steel Works, S. A., of Mexico City. (The "S. A." is a commercial designation meaning something like "stock company.") Associated with him in the latter venture was W. B. Johnstone, who had gone to Mexico from North Car-

olina to work for his uncle.

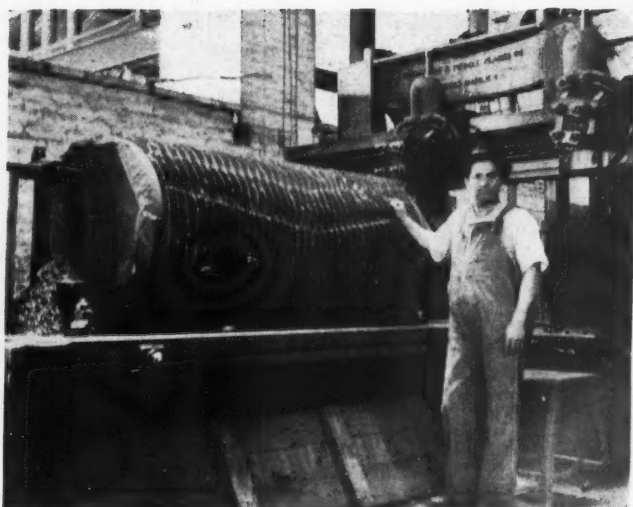
Inspired by their faith in the future of Mexico and a realization of the need for industrial facilities to aid in the development of the country, these two men set up a machine shop for making repairs on railroad locomotives, to make and service generators for gas engines, to manufacture cast iron pipe for municipal water systems, and to make and repair machines and parts for mines, sugar mills, and other industries.

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A Worn-Out "Sugar Shell" or Roll Set Up on a Planer to be Cut Apart with a Planer Tool



Some eight acres of land was purchased at the north edge of Mexico City, machinery was brought in from the United States, and an enterprise was developed which has continued to serve the surrounding terri-

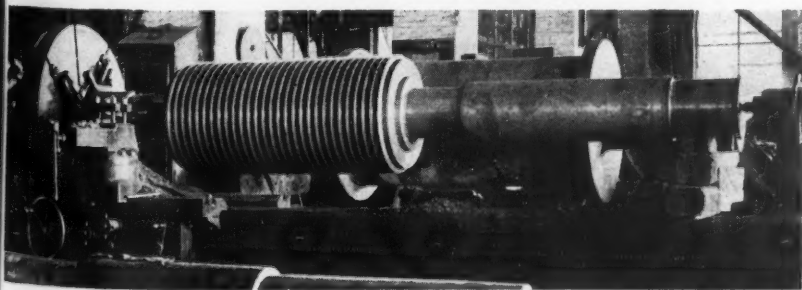
tory. During recent years the closing down of many mining projects and the dismembering of great agricultural developments has of necessity decreased the amount of repair work on locomotives. The shop is now engaged in general repair and replacement work, especially the repair and rebuilding of machinery for sugar and textile mills.

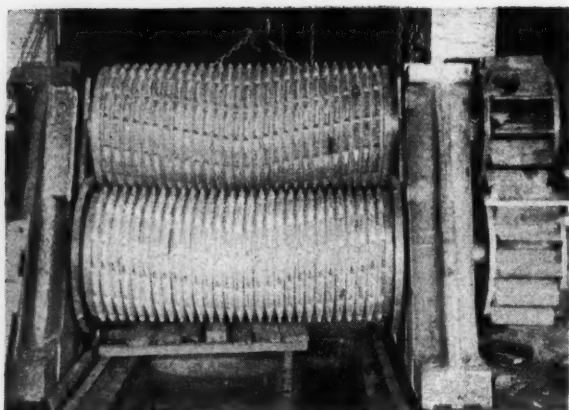
The plant is served both by the National Railways of Mexico and the former system of the Mexican Central Railway, the latter still operating on a narrow gauge track just as

it did in the early days when Fred Johnstone was Superintendent of Motive Power of this road. The cars and engines of both systems use one outer rail, a third rail for the narrow gauge equipment being laid inside the other rail.

All sugar and textile mills in Mexico are equipped with machinery originally brought from the United States or from Europe, and replacement parts were formerly imported from the original manufacturers. As a result of the war now in progress, however, imports from Europe have

Grooving a New Sugar Shell in a 60-Inch Lathe in the Machine Shop of the National Iron & Steel Works





A Sugar Cane Crusher Assembly of Two 33-Inch "Shells" Set Up for Use after Being Rebuilt

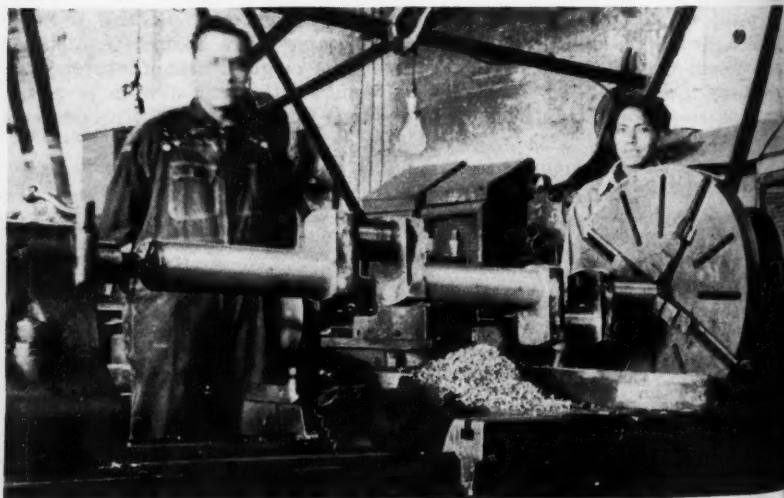
been cut off and, because the rates of money exchange are unfavorable to the Mexican who wishes to import from the United States, purchases of machinery and factory equipment from the U. S. have been reduced very drastically.

These circumstances have resulted in a considerable increase in the number of repair and replacement jobs

on heavy machinery and are bringing the shops of the National Iron and Steel Works many jobs that present new problems and for the solution of which new methods have to be planned.

When Mr. Johnstone was asked for permission to tell the story of his plan to the readers of MODERN MACHINE SHOP, he demurred on the ground that his shop was far from being as modern as similar shops in the United States, but when it was pointed out to him that the executives in the shops of the country to the North are always inter-

Turning a 3-Inch Crankshaft for Use in a Textile Mill. The Machine is a 30-Inch New Haven Manufacturing Company Lathe

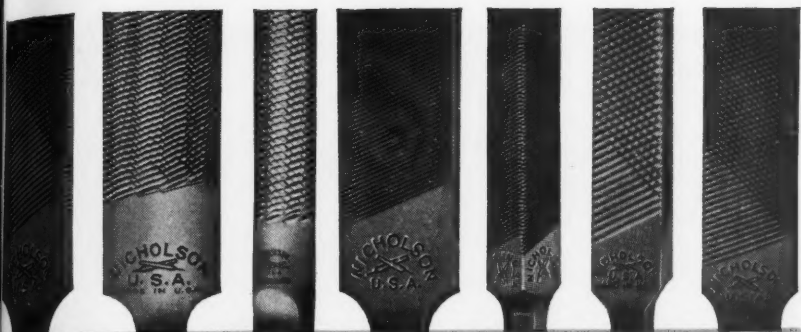




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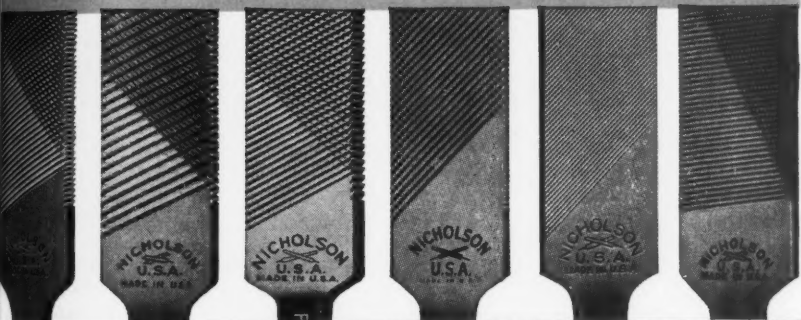
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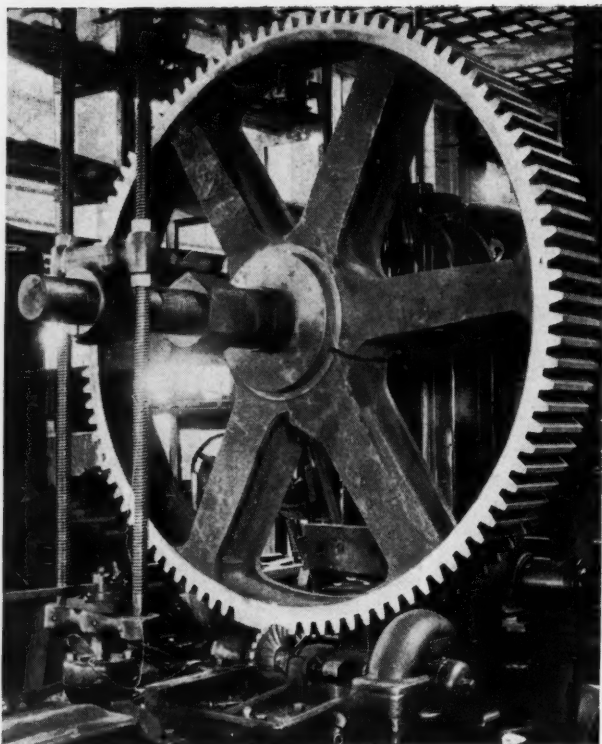
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Cutting Teeth in a new 72-inch Gear, for Which a Gould & Eberhart Gear Cutting Machine is Used

ested in unusual tools and methods, particularly those that have been devised under the spur of necessity, he assented.

Mr. Johnstone is ably assisted in the direction of his plant by General Superintendent William Henry Romero, a native of the Republic of Colombia, who studied textile engineering more than twenty-five years ago at Lowell, Mass. The Master Mechanic of the shop is Antonio Romero Carrera, a Mexican citizen who learned his trade during some twenty years spent in the United States, as did the General Foreman, J. Cadena, who worked in machine shops for railroads and other industries in Texas, Colorado, and Illinois. Of the remaining 200 employees, possibly

ten per cent have worked north of the Rio Grande.

One of the most frequent of the jobs that come into the National Iron and Steel Works shop is the replacement of sugar "shells" or rollers for the crushing of sugar cane and the extraction of its juice at the many sugar mills of the Mexican Republic.

These great rollers are often as much as 33 inches in diameter, and weigh more than seven tons each.

The rollers are made from castings which are cast in the National Iron and Steel Foundry. A bearing is bored in each end of a roller to a diameter of 12 inches, and a shaft is then fitted and anchored in the bearings. In the United States such rollers are forced onto the shafts on which they are to revolve, but in Mexico there are no machines available capable of exerting this tremendous pressure, so the shells are heated and shrunk onto their shafts.

When a roller becomes worn or so badly broken that it will no longer serve, it is cut from the shaft by cutting with a planing tool on a Woodward & Powell planer. A new roller is then shrunk onto the shaft after which it is grooved on a lathe

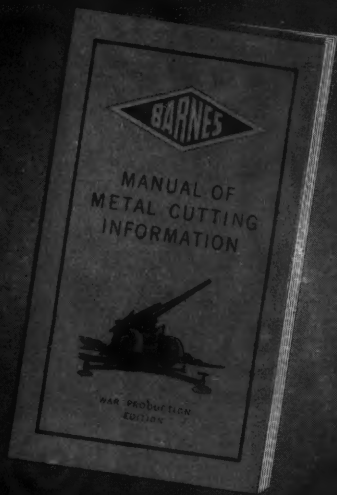
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# A Manual of



# Metal Cutting Information

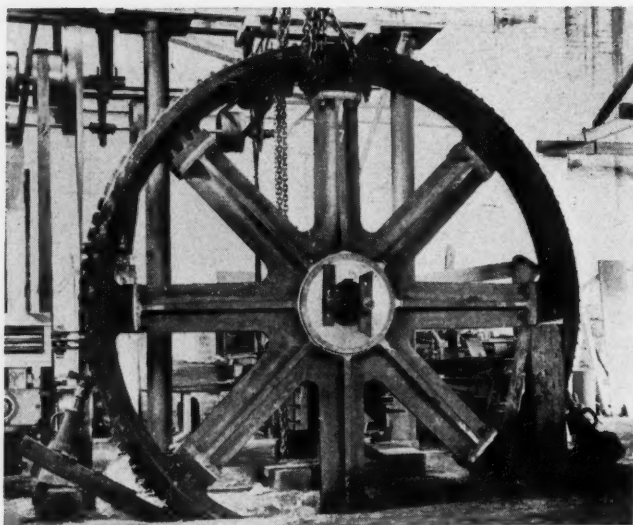
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the grooves being cut so that they will match those of the companion roller with which it is to operate. After the grooves have been cut, serrations are milled in to form teeth so that the sugar cane will be pulled in between the rolls when the mill is in operation.

Such parts as crankshafts are forged in the hammer shop, then laid out and machined in the lathe and planer. Such a shaft, intended for use in a textile mill near Orizana in the State of Veracruz, is illustrated herewith.

Another operation of which Mr. Johnstone and his employees are justly proud is the manufacture of cast iron pipe of 48-inch inside diameter. The machine used to drill this large pipe is a universal drill press of unknown origin and from which the name plate has been lost many years—but the old machine is still render-

ing excellent service in its job in the manufacture of the largest water pipe made in the Republic of Mexico. Another heavy job that is turned out at regular intervals from this shop is the manufacture of heavy gears for

use in textile mill and other industries in all parts of the Republic. Some of the gears are cast with solid rims into which the teeth are cut with a Gould & Eberhardt Gear Cutter, and others, of still larger size, have the teeth cast in. Such jobs come from points nearly 1,000 miles away, both to the North and South. Inasmuch as Mexico City is located on a plateau almost 8,000 feet above sea level, no sugar cane is grown in the vicinity, so sugar mill parts are shipped in from quite distant points. The story of the development of the National Iron and Steel Works plant is a chapter in the story of the industrial development of Mexico itself, which, through the faith and efforts of such men as W. B. Johnstone and those who are associated with him, is slowly but surely advancing to a point of modern industrialism in keeping with its abundant natural resources.

**"Nopak" Hy-Pressure Hydraulic Operating Valve** is described and illustrated in a six-page folder prepared by

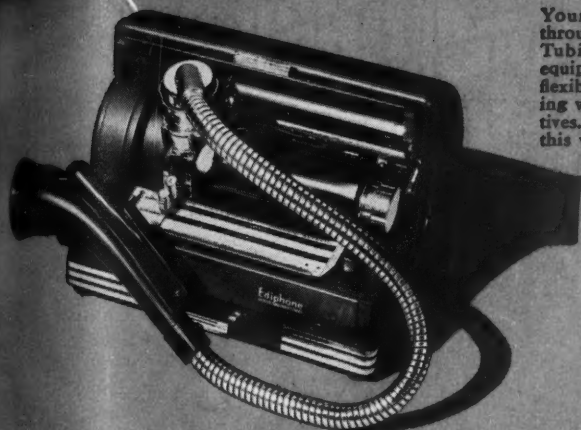
the Galland-Henning Mfg. Co., 2738 31st St., Milwaukee, Wis. Copy upon request.

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May, 194



# MACHINE TOOLS USED FOR CIVIL WAR MONITOR JOIN IN ALL-OUT PRODUCTION

WASHINGTON, Feb. 26—(INS)—The Monitor long since gave up the ghost, but the machine tools that built the Civil war "Ironclad" are producing for their fourth war.

In a shop at Providence, R. I., a huge, old planer that smoothed the deck plates for the Monitor—fore-runner of today's steel dreadnaughts—is working away on equipment used in the fight against the war product.

The war product is this as a classic example of what Uncle Sam produces.

A surprisingly few of these ancient tools, in war production board, give valuable service in spite of requirements.

Moreover, certain lathes and other machine tools that turned out parts for the engine of the Civil war vessel, nearly a century ago, also are enlisted for the duration of the present conflict.

Other Civil war veterans include a steam hammer in Milwaukee, which shop men have to use along to keep it from bending, and a verticle boring mill in Allentown, Pa., that was built in 1865 and last year of the states.

Many at Lynn, Mass., that was the Columbian Exposition in Chicago in 1893.

Machine Tools, regardless of age are doing their bit producing for "all-out" War. LIMA GEARSHIFT DRIVES adaptable to all types of machine tools, simplify machine operation, increase operator efficiency and eliminate time waste, so vitally essential today. Lima Drives will step-up your production ... write us today.

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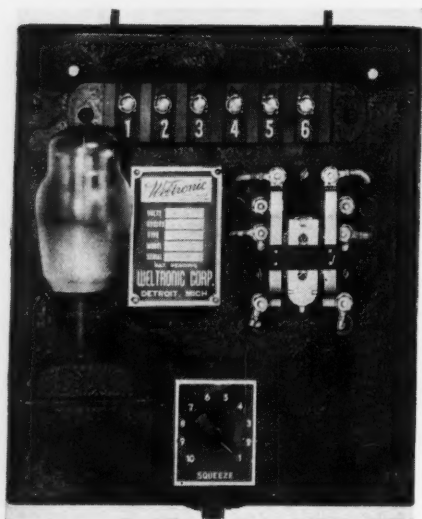
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LIMA ELECTRIC MOTORS • LIMA MAGNETIC POLISHING LATHES • LIMA GEARSHIFT DRIVES

# Identifying and Curing Pressure Switch "Troubles"

By L. F. STANDER  
Engineer, Weltronic Corporation

**I**N resistance welding there is probably no one single unit that gives more trouble, by and large, than does the pressure switch. What is more, troubles originating with pressure switches are frequently hard to identify and many an hour of production has been lost by hunting elsewhere for the trouble.



Weltronic Model No. 65 "Squeeze Time" unit, designed to replace Pressure Switches in resistance welding installations. Available also as an integral part of Weltronic sequence timers.

While there are some excellent pressure-switches on the market, the average pressure switch is by nature a sensitive and delicate device. The main difficulty with such a device is that — being necessarily light in weight—it frequently also has a relatively short mechanical life.

Primary function of a pressure switch is, of course, to automatically start the welding current, or current control timer, as soon as the work and electrodes are ready for the weld. It does so by virtue of the fact that when the electrodes have been brought into position and welding pressure is applied, the built-up air or hydraulic back-pressure trips the switch.

In order that there will not be too long a delay before the start of the weld, the pressure switch must be adjusted, usually, to function at a pressure somewhat lower than the maximum that will be built up in the pressure cylinder of the welding equipment. This is particularly true since the actuating of the pressure cylinder itself tends to temporarily lower the pressure in the supply system.

This in itself introduces some of the more common difficulties with pressure switches. Supposing for instance, a pressure switch is set to

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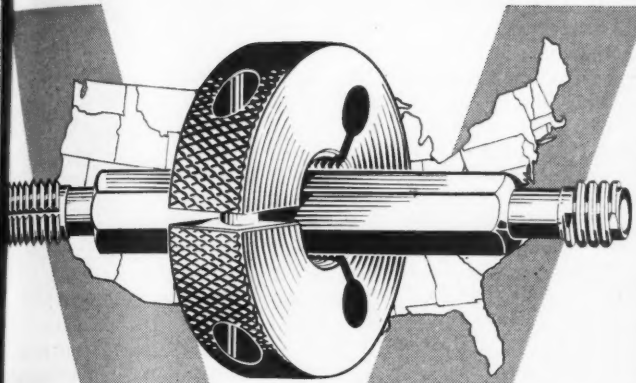
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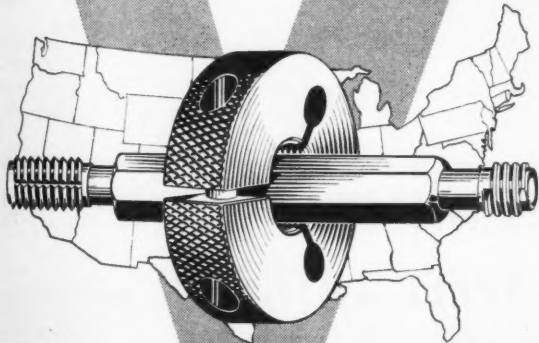
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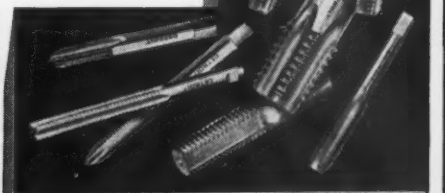


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operate at 60 pounds back pressure, while the "nominal" line pressure is 80 pounds. If the line pressure fluctuates, or if there are mechanical restrictions in the line, the pressure switch probably will not operate quickly enough to satisfy production requirements. The usual practice under such conditions is to look for the trouble almost everywhere else except to the pressure switch. Assuming, however, that the trouble has finally been located as originating at the pressure switch, the normal practice is to reduce the back pressure setting of the switch to, say, around 40 pounds, rather than to go to the tedious work of correcting the basic trouble; namely, removing the air line restrictions.

The re-setting of the switch to operate at a lower pressure will, of course, speed up the operation, but it may—and only too often does—introduce other difficulties. The most

obvious of these is that the pressure switch will start the current before there is sufficient pressure between the electrodes and the work, thus permitting the possibility of burning the points, and so on.

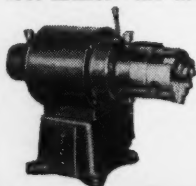
Another difficulty sometimes experienced is that the welding equipment will fire before sufficient pressure has been built up at the electrodes, although the pressure switch setting may be theoretically sufficiently high. Such difficulties are frequently traceable to "binding" or friction in the mechanical equipment permitting a temporary building up of back pressure, tripping the pressure switch. Such troubles are particularly experienced where the pressure switch setting is relatively low (to speed up production).

Erratic firing of welding equipment is also frequently traceable to pressure switches. This is not infrequently due to small amounts of dirt

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4. Selection of thickness of cut
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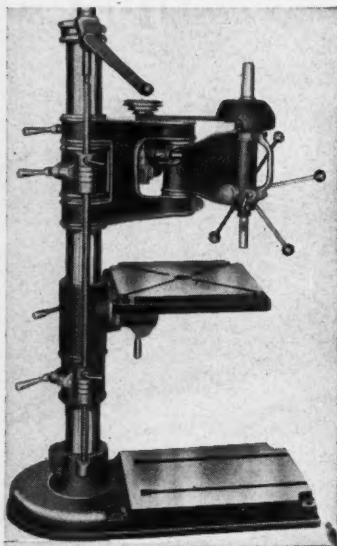
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oil, or other form of sediment, clogging the pressure switch, either temporarily or semi-permanently. Such clogging frequently is not sufficiently complete to stop its functioning entirely, but does interfere with its calibration. This kind of trouble is especially difficult to trace down and its source may be looked for almost anywhere, except in the pressure switch—since the latter can be observed to be “functioning.”

It was to overcome these difficulties that Weltronic some time ago developed its “Squeeze Time” unit to replace the conventional pressure switch. This unit, operating on a fixed time-delay basis, is positive in action, and eliminates all possible variables with the exception of the time required for the points to be brought together on the work. This time may be easily checked and a minimum factor of safety allowed in setting the “Squeeze Time” control unit.

The only difficulty which the unit cannot overcome is the possibility that due to binding of the gun or unavailability of adequate line pressure full pressure is not realized at the gun points. The net effect of this is that the points might be burned. However, this difficulty in itself has the advantage of immediately identifying this source of trouble at the cost (at the most) of replacing a set of points.

“Here Are the Answers to Ninety Per Cent of Your Problems in the Use of Coated Abrasives” is the title of an eight-page folder by E. B. Gallahan, M. E., which is now being distributed by the Clover Mfg. Co., Norwalk, Conn. Treated in the folder are common causes of failure in coated abrasives, method of protecting coated abrasive stocks, losses caused by improper storage, losses due to improper operative methods, and effect of humidity on flexibility. Copy free upon request.



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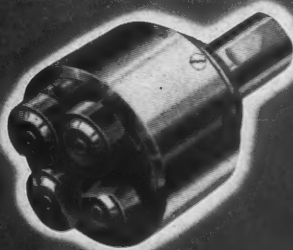
By similar economical planning — One Basic Design in the new "RS" Tap serves both revolving and stationary spindle machines. Quick and positive opening action, fine diametric adjustment and ground thread chasers offer the same precision and trouble-free production you are now getting from Namco Dies. Ask for proof of this outstanding performance.



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# Speed-Up Arc Welding-- Use Larger Electrodes

By H. O. WESTENDARP, JR.

Welding Engineer, General Electric Company

**T**HE arc welding process has demonstrated its effectiveness in speeding up the production of ships, tanks, guns, and innumerable other products urgently needed in large volume for the war program. The problem now is to speed up arc welding; the problem of more work with less men must be solved.

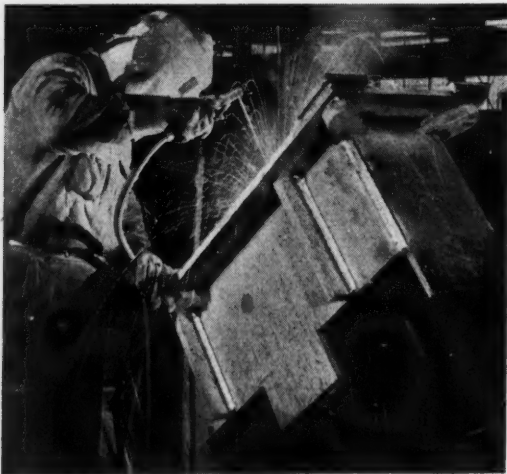
The answer is—on those applications where work conditions permit, use larger diameter electrodes which have a faster deposition rate in pounds per hour. Many jobs are being welded today with 5/32 in. or  $\frac{1}{8}$  in. diameter electrode where a larger diameter electrode could be used to produce welds just as high in quality

and at a decided increase in speed.

Military requirements are draining our manpower needed for production work. Arc welding is a process which requires highly specialized training, which takes time (approximately four months). Based upon present estimates of 200,000 arc welding operators in the industry, a study of the following data will indicate that if these operators could swing to larger electrodes on one-quarter of their work the result would be equivalent to an immediate addition of from 15,000 to 25,000 experienced operators to the welding industry.

Using larger electrodes for increased speed is not a new idea; it has frequently been advocated by welding engineers and some progressive plants are now operating on this basis. Under today's conditions, however, it is of the utmost importance that this matter be investigated thoroughly by all users of welding. In such investigation a careful analysis should be made to determine:

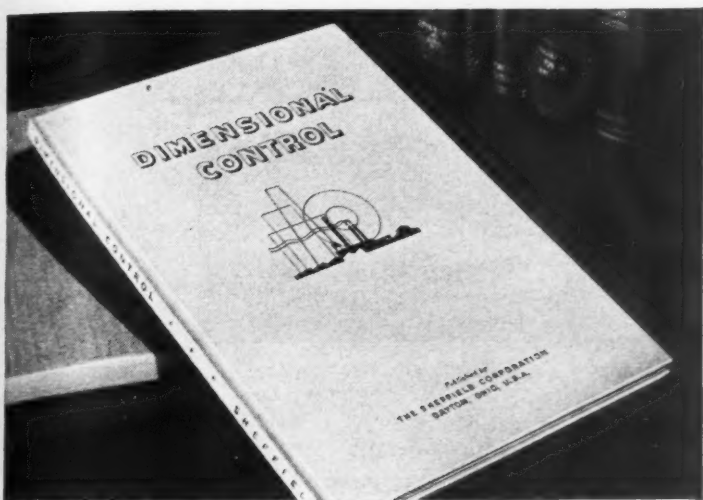
1. The general classes of arc welding where the



Steel Machine Base Being Welded  
with 5/16 Inch Electrode

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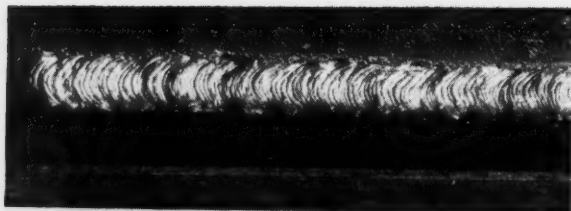
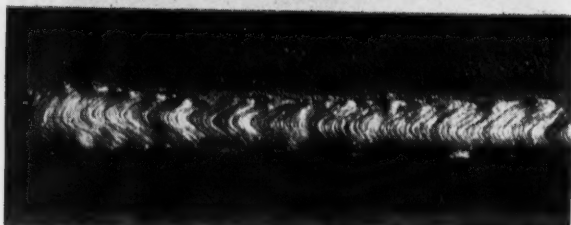


Photo of Two Fillet Welds  
One Produced with 3/16-Inch  
Electrode, the Other with 1/4-  
Inch; Same Size Fillet; One  
Minute Welding Time. Length  
of Fillet Produced with 1/4-  
Inch Electrode, 10 Inches  
With 3/16-Inch Electrode  
5 1/2 Inches



### Fillet Size

An increase from 5/32 in. diameter to 1/4 in. diameter electrode is not recommended for vertical fillet welds until the size of the fillet reaches 1/4 in. or greater. A 5/32 in. di-

"speed-up" may most effectively be accomplished.

2. The specific applications in these classes where work conditions permit larger electrodes to be used.

The following considerations will serve as a guide in changing successfully from smaller to larger electrodes.

### Position of Welding

A 5/32 in. diameter electrode is the largest size with which it is practical to weld in the vertical and overhead position. Larger electrodes require amperages which produce too much heat for proper control of metal in vertical and overhead welds; as a result spatter loss is excessive, and poor welding results.

ameter electrode is preferred for making 1/4 in. and smaller fillet welds in the vertical position. A 1/8 in. diameter electrode applied to these smaller size fillet welds results in surplus weld metal being deposited in the form of a convex bulge or the fillet which would not contribute to strength and would waste scarce electrode material.

### Plate Thickness

Many applications are such that the work either is or can be successfully positioned for flat welding. In this, as in the vertical and overhead position, plate thickness will affect the maximum size electrodes that can be regarded as practical to use. Generally speaking, electrode diameters up to the plate thickness can be used.

TABLE 1

Typical Deposition Rate Pound Per Hour—100 Per Cent Arc Time

Electrode Diameter	Flat*	Horizontal*	Vertical*	Type of Electrode
5/32 in.	2.9	2.7	2.4	All-position D.C. (Reverse Polarity)
3/16 in.	4.5	4.0	3.2	All-position D.C. (Reverse Polarity)
1/4 in.	8.0	6.0	—	Flat A.C. or D.C. (Straight Polarity)
5/16 in.	11.5	—	—	Flat A.C. or D.C. (Straight Polarity)
3/8 in.	13.5	—	—	Flat A.C. or D.C. (Straight Polarity)

\* Current at proper value in all cases.

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TABLE 2

Position of Welding	Change in Electrode Size	Increase in Deposition Rate
Vertical and Overhead	5/32 to 3/16	33 per cent
Horizontal	3/16 to 1/4	50 per cent
Flat	3/16 to 1/4	77 per cent
Flat	1/4 to 5/16	43 per cent
Flat	5/16 to 3/8*	18 per cent

\* Experience indicates that magnetic arc blow increases with the size of electrode and welding current. Therefore the  $\frac{3}{8}$  in. diameter electrode is generally recommended for operation with alternating current only.

This is affected, however, by other conditions, such as fit-up, type of joints, etc. Electrodes are available in sizes up to  $\frac{3}{8}$  in. diameter. Larger sizes have not proven to be practical to date.

Table 1 shows the "speed-up" possible in those cases where work conditions permit change to larger electrodes.

Table 2 shows rather startling increases in speed when considered on a percentage basis:

In addition to the above savings which are based on the difference in deposition rates of electrodes, larger electrodes reduce the number of times the operator has to stop welding and change electrodes. Time required for cleaning the crater and restriking the arc is also reduced. The number of changes required per pound of metal deposited for various size electrodes are shown in Table 3.

TABLE 3

Electrode Size	Electrode Changes per Lb. Deposited
5/32 x 14 in. length	18
3/16 x 14 in. length	13
1/4 x 18 in. length	5
5/16 x 18 in. length	3
3/8 x 18 in. length	2

The following will indicate the major classes of arc welding applications and their corresponding electrode re-

quirements, and will indicate where pressure should be applied in order to speed up production.

### Major Classifications

1. Field welding: Ships, buildings, bridges, pipe lines, etc.  
Approx. electrode requirements—  
85 per cent all-position type  
15 per cent flat type.
2. Shop welding: General fabrication, tanks, gun mounts, ship sub-assembly work, machinery, etc.  
Approx. 65 per cent flat type  
35 per cent all-position type.
3. Shop welding: Repetitive straightline production welding operations, axle housings, tank wheels, etc.  
100 per cent flat type or 100 per cent all-position type.
4. Job shop welding: Miscellaneous small parts.  
Approx. 75 per cent all-position type, 25 per cent flat type.

Attention should be directed to Classes 1 and 2. They offer the greatest opportunity for "speed up." Class 3 has already received detailed study, and in practically all plants the most economical electrode is now being used. For example, a tank wheel fabrication job would be carefully studied to determine the best type of electrode from the standpoint of physical properties of deposited weldability characteristics, speed, etc. Then the type selected would be



# SIMONDS Metal-Slitting Saws

**Quick Delivery  
of Standard Sizes  
on rated orders**



Simonds Metal-Slitting Saws are made to rigid specifications of Simonds Electric Furnace Steel. Radial grinding gives perfect clearance for faster, longer cutting. Sizes from 2½" to 8" diameter. Standard thicknesses.

For Quick Delivery of Standard Sizes on Rated Orders . . . Write:

**SIMONDS SAW AND STEEL CO., FITCHBURG, MASS.**

# SIMONDS

*Famous Family of Metal-Cutting Tools*

used by the entire production line.

Class 4 represent a very small percentage of the industry and the use of larger electrodes is limited by plate thickness and type of work.

Applications in Class 1 should be studied to determine ways and means of increasing from 5/32 in. 3/16 in. all-position type electrodes wherever work conditions permit.

Applications in Class 2 should be studied primarily to determine ways and means of increasing from 3/16 in. all-position type to 1/4 in. horizontal type electrodes, where work conditions permit. This class also includes opportunity for increasing from 3/16 on up to 3/8 in. flat type electrodes where work conditions permit.

**Oakite Service Data.** A special five-page digest which reviews materials, methods, and procedures used for effectively handling 28 essential, com-

monly recurring maintenance jobs has been issued by Oakite Products, Inc., 36 Thames St., New York, N. Y. Prepared for plant maintenance superintendents, safety engineers, and other executives, the digest, in data sheet form, provides many ideas and suggestions for speeding certain jobs, conserving man-hours, increasing maintenance efficiency, improving plant safety, and shortening "down time" for equipment.

Many different types of maintenance work are discussed, such as cleaning tool and machine parts, gears, sprockets, and a wide range of similar equipment before repair and overhaul; cleaning cutting oil and grinding solution lines and systems; descaling Diesel and gasoline engine cooling systems; cleaning air filters; cleaning ammonia condensers, feed-water heaters, and other water-cooled equipment; removing carbonized oil and sludge deposits from heat exchange units without dismantling, and so on. On each of the 28 different types of work is outlined the material used and method followed, the time saved, the fire or other hazards eliminated, or other advantages gained. Copy of digest free upon request.

## Extra Work

### == RUTHMAN == **GUSHER** COOLANT PUMPS

Learn how Gusher Pumps give you exclusive advantages, and speed your production. Write for data and specifications.

#### THE RUTHMAN MACHINERY CO.

1817 READING ROAD

CINCINNATI, OHIO

*Largest Exclusive Builders of Coolant Pumps*



Model P3

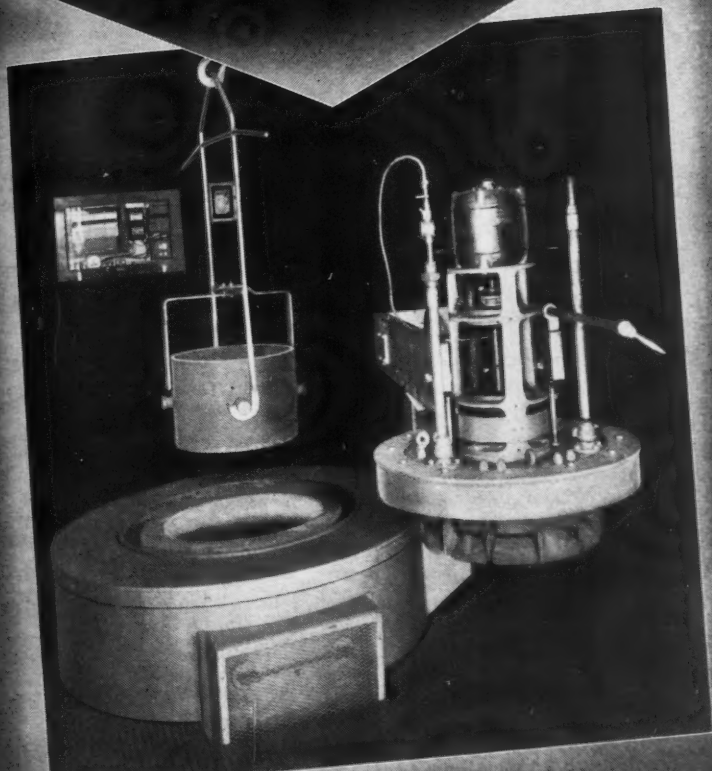
A complete line of Coolant Pumps from 1/30 to 2 H.P. in types and capacities up to 200 gal. per minute, a pump for every requirement you may have. Ruthman Gushers come in immersed types, tank units, pipe-connected types, flange mounted types and plain drive types. There is a Ruthman Gusher Coolant Pump to meet every type of machine tool coolant requirement. Sheets giving dimensions and performance curves are yours for the asking.

P3 is available in external right and left discharge models, flange mounted and immersed models.

Pat. and Pat. Pend.

# ZONE CONTROL IS TRUE CONTROL

Gas Carburizing is accomplished at red heat. The rate of absorbing carbon in the case is very sensitive to the temperature, hence a high degree of temperature uniformity is required. The Hevi Duty Carburizer assures this necessary uniformity by Multiple Zone Control. Send for Bulletin HD 940.



**HEVI DUTY ELECTRIC COMPANY**

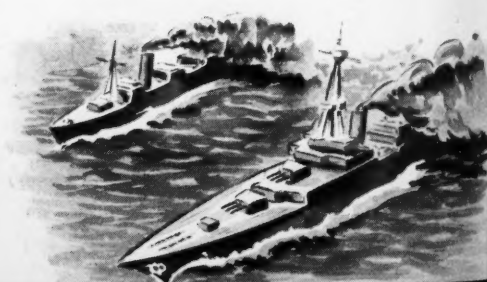
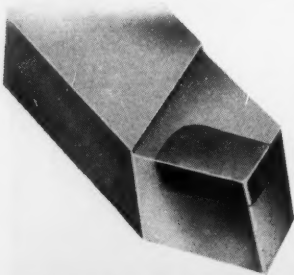
HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY  
MILWAUKEE, WISCONSIN



1942 is Democracy's crucial year. Armament production this year will undoubtedly decide the war. That puts it squarely up to you and every production man in American Industry to increase output **NOW**, despite shortages of machines and skilled help.

How? By getting maximum capacity out of your present machines with **TECO Carbide Tools**—noted for their accurate, high speed cutting and longer runs between grinds.

**TECO Carbide Tools** are available promptly in grades and styles for practically every machining need. Put these producers to work—**NOW!** Try a test run and be convinced.



## TUNGSTEN ELECTRIC CORPORATION

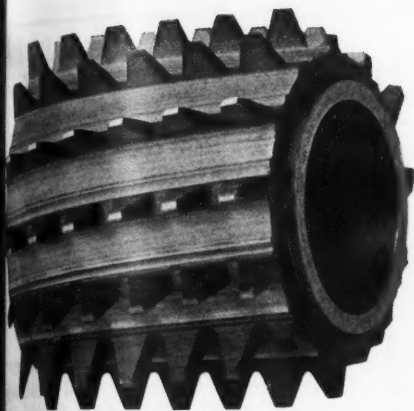
562 39th Street

Union City, N. J.

Branch Office: 2906 Euclid Avenue, Cleveland, Ohio

Pioneers in Tungsten Carbides for Over a Quarter Century





**T** HIS HOB produced 66,337 lineal inches of gear tooth in the six months preceeding its "retirement". The teeth were ground back until they were only 3/64" thick at the tip, yet not a single tooth broke out. Made double-thread, ground form, this hob was used to cut 35 tooth, 5-7 pitch gears, 7-1/4 diameter by 1-1/4 face. Material was SAE 4620 annealed steel. Average production, using .060 feed per revolution of work and hob speed 154 r.p.m., was 10.6 gears per hour. Total life was 29 sharpenings, with .019" stock removed per grind. 3 settings per grind, 18 pieces per setting were obtained.

## PROPER HOB SHARPENING GIVES LONG LIFE AND MAXIMUM PRODUCTION

"Conserve critical materials!" This is an important catchword in these times of war. Users of hobs are critically affected as it becomes necessary to get the greatest possible production from cutting tools of all kinds. The following precautions will be helpful in this effort, to assist you in getting the maximum life out of your hobs.

### OBSERVE THESE SUGGESTIONS...

1. Use index method of sharpening. Maintain proper spacing of teeth.

2. Be sure that hob teeth are sharpened radially. Avoid a positive or negative rake, except where it is recommended, such as B-C Hi-Production hob.

3. Guard against hob runout on either or both ends on the sharpening machine.

4. Do not allow hobs to become excessively dull in one position.

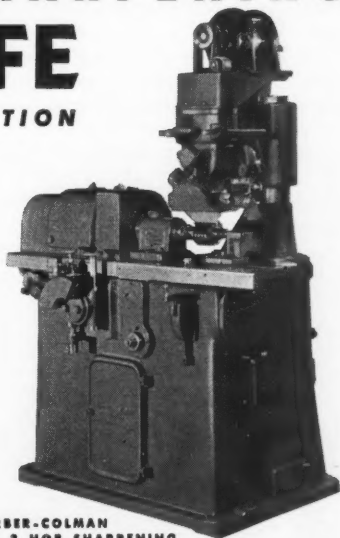
Sharpen at regularly determined intervals, whether the hob "looks like it needs it or not."

5. Always remove a uniform amount of stock.

6. Be sure to select the proper grade of grinding wheel.

7. Shift hob position frequently.

8. Correlate feed and speed to be used, with the production desired, so that resulting hob cost will not offset the advantages of the increase in production.



**BARBER-COLMAN  
NO. 3 HOB SHARPENING  
MACHINE**

Specially designed for sharpening hobs and formed cutters, this machine insures duplication of original sharpening. Once the set-up is completed, the entire sharpening operation is automatic, relieving the operator for other work. Write for descriptive bulletin F684-S.



COLMAN  
PRODUCTS

MODEL HOBBING  
MACHINES; HOB  
SHARPENING MA-  
CHINES; REAMERS;  
REAMER SHARP-  
ENING MACHINES;  
MILLING CUTTERS;  
SPECIAL TOOLS

## BARBER-COLMAN COMPANY

General Offices and Plant 207 Loomis Street, Rockford, Illinois, U. S. A.

# Modern Equipment at Work

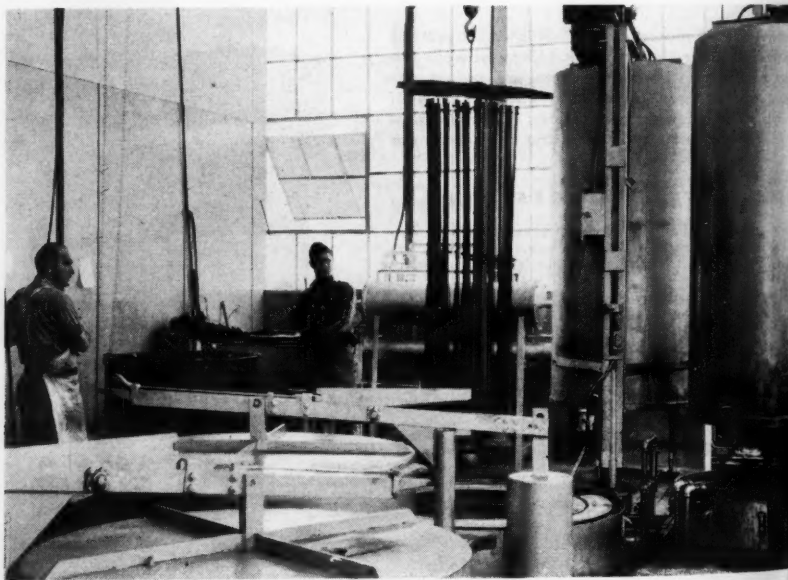
## Heat Treating Vital Parts for Lockheed Interceptors

**T**UBULAR parts for the speedy Lockheed Interceptor planes now being turned out for use both by this country and Great Britain are produced in record time at the Menasco Manufacturing Company. Since these vital parts must be both elastic and tough to withstand the strain of lightning-like Interceptor movements, careful heat-treating is essential.

To accomplish this job in step with today's high-gear production, Menasco has installed four General

Electric cylindrical electric furnaces for hardening and drawing, and a water-cooled oil quench. Two G-E atmosphere gas converters maintain an inert atmosphere in the furnaces and assure that the analysis of gas in the furnaces is constant regardless of changes in the rate of flow.

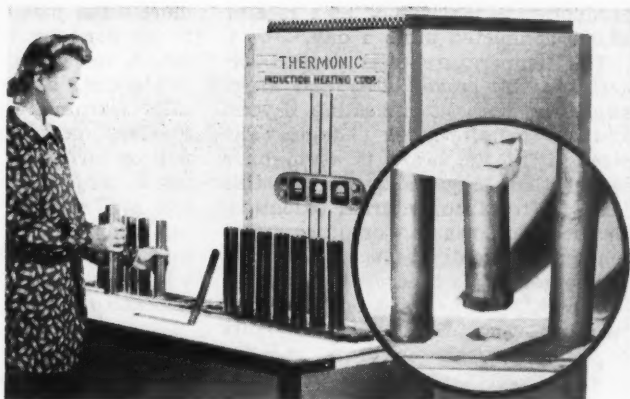
Heretofore, one of the greatest difficulties in hardening and drawing tubular parts has been excessive cooling encountered in transferring the parts from the furnace to the quench tank. This difficulty has been overcome at Menasco by installing two quenching hoods on the G-E hardening furnaces to protect the



Transfer Hoods on these two G-E Vertical Cylindrical Electric Furnaces Eliminate Excessive Cooling During the Transfer of Parts from the Furnaces to the Quench Tank. In Operation at the Plant of the Menasco Manufacturing Company, the Furnaces are Used to Heat Treat Tubular Shaped Parts Used on Lockheed Interceptors. The Furnaces are 30 Inches Inside Diameter and Suitable for Parts up to 60 Inches Long.



At a Cost of 1/10 of  
a Cent Per Piece, this  
Induction Heating  
Unit Makes Possible  
a Production of 10,000  
Brazed Units Per Day



parts as they are  
transferred.

This transfer of  
parts is accom-  
plished quite  
simply. After the  
charge is brought  
up to the proper  
temperature in the hardening fur-  
nace, a high-speed hoist, equipped  
with a transfer hood, is brought over  
the furnace and the charge quickly  
pulled into the transfer hood. The  
hood is then positioned over the oil  
quench tank and the charge quickly  
dropped into the oil. This transfer  
hood minimizes cooling, warpage,  
and scaling of the thin-wall tubular  
parts during transfer from the fur-  
nace to the oil quench tank.

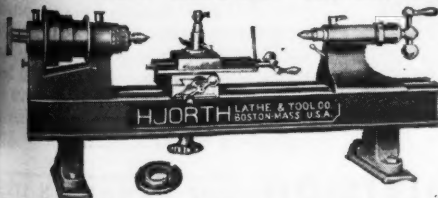
made it possible to perform a pro-  
duction brazing operation at a speed  
hitherto impossible in an Eastern  
plant. The unit is a section of tub-  
ing, to which a hexagon nut is brazed  
as shown in the illustration. Skilled  
labor is not necessary, inasmuch as  
all that the operator has to do is to  
set the assembled unit into a hexa-  
gon-shaped aperture in the induction  
heating unit, push a button, and the  
unit does the rest.

Seven units are brazed at a time,  
using a silver brazing alloy which in-  
stantly penetrates through the joint.  
After the preliminary set-up no ad-  
justments are necessary; the opera-  
tion thereafter is automatic and  
there are no rejects because every  
unit is exactly like the others. With  
this equipment a continuous flow of

## High Speed on Brazing Operation

THE use of "thermonic induction  
heating," which can be applied in-  
stantly by push button control, has

## ... for more than 1001 odd jobs



The HJORTH Bench Lathe has the  
speed, accuracy, handling ease,  
and dependability that appeals  
to every operator. That's why  
you'll find the better shops  
equipping with the HJORTH Lathe.

Write today for data  
and prices.

**HJORTH LATHE & TOOL CO., 12 BEACON ST., WOBURN, MASS.**

production is maintained at a rate of 10,000 completed units a day.

The temperature is controlled exactly to the brazed area and areas adjoining, with no annealing beyond and no metallurgical change. The strength of the braze is as high or higher than the solid parts. As this joint is free from internal oxidation, the need for cleaning or other maintenance is greatly reduced.

Another important feature is the low cost, which, based on a rate of two cents per K.W. hour, amounts to 1/10 of a cent per braze.

## Controlling "Night Lights" with an Electric Eye

**T**HE "electric eye," used for years to count traffic, open doors for busy waitresses, sort coffee beans according to color and do a dozen or

more other jobs which previously had to be done by hand, has just come into a real wartime occupation, that of standing by as all-night guard for alert warnings of possible air raids. Focused on the street lights, which will be turned off the instant a warning is received in any city, the "electric eye" sounds an immediate warning and likewise turns off the lights in the home, store, display signs or wherever lights are to be extinguished to perfect a city blackout.

The idea originated with Andrew Tessier, who with his brother conducts a small machine shop in Schenectady, N. Y., and is engaged in wartime defense orders. When war was declared, orders were issued to all people, including business houses that lights must be extinguished within five minutes after an air raid warning. Tessier's shop is too small to afford an all-night watchman, yet he felt that it would be dangerous to

## ★★★★★ An Important Machine Tool In AMERICA'S **SPEED-UP** PROGRAM



**8" x 16"**  
and  
**8" x 24"**  
**CAPACITIES**

The cutting speed and complete adaptability of the Kalamazoo Metal Cutting Band Saw make it exceptionally valuable in America's growing war industry. It is easily

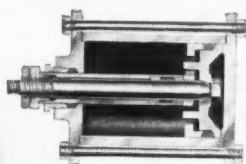
portable—can be moved to the work saving set-up time and waste motion. New hydraulic controls and new precision design make possible positive accuracy within thousandths of an inch, saving expensive steel and extra machining. Sturdy, ball bearing equipped throughout, with hydraulic cushioned action. Write for complete specifications.

**MACHINE TOOL DIVISION  
KALAMAZOO TANK & SILO COMPANY**

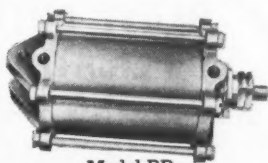
**307 HARRISON STREET  
KALAMAZOO, MICHIGAN**



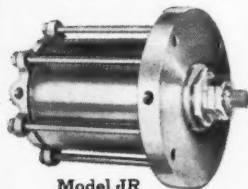
16 in. x 7 ft.  
honed cylinder bore



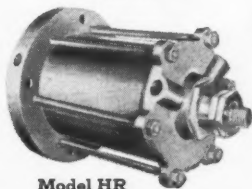
Sectional View



Model BR



Model JR



Model HR

## Precision Cylinder Construction Gives You High Efficiency Use of Air Power

The demands of continuous production make cylinder design more important than ever before. Hannifin pneumatic cylinder design incorporates the features that mean greatest useful work from air power—without leakage, with minimum friction loss, and simplest maintenance. Hannifin cylinders, including even the largest sizes, are bored and then honed, producing a cylinder bore that is straight, round, and perfectly smooth. The soft, graphite treated piston packing is easily ad-

justed from outside the cylinder, allowing the efficient piston seal to be maintained throughout the entire life of the packing. The piston can be repacked if necessary with standard graphited packing, always available.

Hannifin pneumatic cylinders are built in a full range of standard mounting types, sizes 1 to 16 inch diameter, for any length stroke. Both single and double acting types, with or without cushion. Special cylinders built to order. Write for cylinder Bulletin 34-MM.

**HANNIFIN MANUFACTURING COMPANY**

621-631 South Kolmar Avenue • Chicago, Illinois

# HANNIFIN PNEUMATIC CYLINDERS

**FOR  
HEAVY DUTY  
APPLICATIONS  
REQUIRING LARGE  
AIR VOLUME**



**Model 10 FF60VC**

Complete line includes 12 sizes of Gast Rotary Air Pumps  $\frac{1}{2}$  to 23 C. F. M. Vacuum to 28". Pressures up to 30 lbs.

**GAST VACUUM PUMP**

For any vacuum service which must be operated at full capacity, continuously or intermittently, this Gast Heavy Duty Vacuum Pump has been found exceptionally satisfactory. Among the definite reasons for this pump's superiority are: (1) the Gast Rotary Design, which provides smooth, non-pulsating operation; (2) Forced-Air-Cooling which results in more air volume without complicated water systems; (3) Direct Drive at motor speed which saves space and weight; and (4) the money-saving Automatic Take-Up which compensates for wear.

The Model 10 FF60VC may be the heavy duty pump that fits your needs. Or consult with Gast engineers who are helping solve many new and puzzling air and vacuum pump problems arising in war production.

**SEND FOR YOUR FREE COPY  
OF THE NEW AIR PUMP CATALOG**

Contains full descriptions, engineering data, performance tables, and many photographs of interesting actual applications of the complete line of Gast Rotary Air Pumps and Compressors.

Write for your copy today.  
Address: Gast Mfg. Corp., 137 Hinkley St., Benton Harbor, Michigan.



**GAST  
ROTARY AIR  
PUMPS**

put out his night lights. However, he tried it and the first night his lights were all out, his place was broken into.

It was then he hit on the idea of using a photo tube; or "electric eye" as it is more popularly known. He installed this at the window on the second floor of his shop, with the eye pointed toward the street light on



An "Electric Eye" Focused on an Adjacent Street Light Can be Used to Operate the Switch for Night Lights or Electric Display Signs

the corner, and adjusted it so that whenever the street light went out all lights in his place would go out. When the street lights came back again, on would go his all-night lights.

The electric eye equipment, secured from General Electric, cost about \$30. It cost him \$10 more to install it, so for an expense of less than \$50, Mr. Tessier has an all-night guard on the lighting of his plant for the duration of the war. Against \$20 or \$25 per week he would have to pay a watchman to perform

OVER 2000 STOCK SIZES

STRAIGHT  
FLANGED  
SPHERICAL



JOHNSON

*Ledaloyl*  
SELF LUBRICATING  
PATENTED



## BRONZE BEARINGS

Eliminate delay in securing bearings by specifying JOHNSON LEDALOYL. Tool and die equipment are on hand for more than 2000 individual sizes.

You eliminate frequent replacement when you install LEDALOYL... the newest development in powder metallurgy. Our exclusive process of PRE-ALLOYING the basic materials imparts bearing qualities not obtainable by any other method. Stocks are carried in all principal cities. Write for a copy of our new catalogue. It's FREE.

**JOHNSON BRONZE CO.**

*Sleeve* BEARING HEADQUARTERS

590 S. MILL STREET • NEW CASTLE, PA.



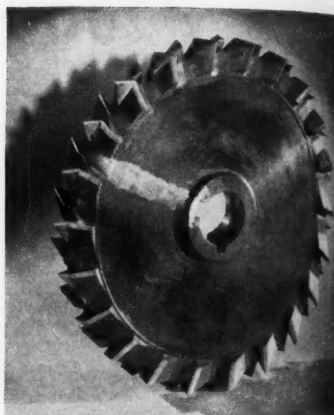
the same duty.

The device that Mr. Tessier has installed could be used in any shop or place of business that does not have an all-night watchman. Night-lights or electric signs can easily be controlled in this manner.

## How to Weld a Keyway Cutter

**W**ITH metal working tools at a premium these days it is vitally important that broken pieces be repaired if it is at all possible to do so. A case in point at the Westinghouse East Pittsburgh works is that of a \$100 keyway cutter which was repaired at a total welding cost of \$25.

A 0.005-inch crack extended from keyway to base of the cutting tools. To repair, grooves were extended on both sides of the cutter and ground



Cracked and scrapped cutters can now be reclaimed with savings in money and time. On milling cutter piece a stainless steel welding rod  $\frac{1}{8}$  inch in diameter was used to weld a 0.005-inch crack extending from keyway to base.

$\frac{1}{8}$  inch. The radius of the groove at the bottom was 10 degrees. The

## SIMPLIFIED INTERNAL GRINDING with the MAJESTIC INTERNAL GRINDER



An exceptionally wide range of internal grinding jobs can be handled on the New Majestic Internal Grinder. Its simplicity of design and ease of operation are features of utmost importance in providing maximum grinding output at low cost.

### SPECIFICATIONS

Length of table, 48". Swing over table, 18". Travel of cross slide,  $2\frac{1}{4}$ ". Precision dial graduated to .0001". Precision bearing work head. Speeds — 100, 225, 350 r.p.m.

Write for complete details contained in New Bulletin

## Majestic Tool & Mfg. Co.

2950 E. Woodbridge

Detroit, Mich.



# PRODUCTION STRATEGY PREVENTS A TRAGEDY

Tragic indeed would be our tungsten shortage were it not for the strategic importance of Molybdenum as used to make metal-cutting tools of

## MO-MAX

### Molybdenum-Tungsten High Speed Steel

Long before the present crisis, thousands of tons of MO-MAX were purchased for quantity and quality production because tools made of MO-MAX, with less than two percent of tungsten and no increase in vanadium, proved 20 percent more efficient, on the average, than tools made of 18 percent tungsten steels. Now, with that distinguished service record in widely varying applications, with a reduced supply of tungsten and vanadium, with the need for production greater than ever, the use of MO-MAX is strategic, scientific, economic and patriotic.

For complete technical data write for booklet to any of the mills listed below or to The Cleveland Twist Drill Co., Cleveland, Ohio.

*Milling keyways in stern diving-plane shaft—a typical job for MO-MAX steel.*

*These leading independent steel companies can supply you with standardized MO-MAX under their own trade names:*

Allegheny Ludlum Steel Co.	"Molite B"	Columbia Tool Steel Company	"Tatmo"	Lafayette Electric Steel Co.
Atlas Steels, Ltd.	"Rex-T Mo"	Crucible Steel Co. of America	"S.T.M."	Simonds Saw and Steel Co.
Bethlehem Steel Corp.	"Di. Mol"	Henry Disston & Sons, Inc.	"Mo-Tung"	Universal Cyclops Steel Corp.
Brasburn Alloy Steel Corp.	"Rex T Mo"	Halscomb Steel Co.	"Vul-Mo"	Vulcan Crucible Steel Co.
Carpenter Steel Co.	"Mogul"	Jessop Steel Company		

2173A

MODERN MACHINE SHOP 163

ter was preheated to 800 degrees Fahrenheit and welded with Flexarc 18-8 stainless steel rod,  $\frac{1}{8}$  inch in diameter. The piece was reheated to 800 degrees and allowed to cool slowly in an open end furnace. The cutter was then hardened by heating to 2300 degrees Fahrenheit, followed by cooling in air blast.

### Recruiting Continues for Technologists

About a year ago the Federal Civil Service Commission began a recruiting drive for technologists. The number of persons on the employment lists now established is not sufficient for today's war-time needs. Accordingly, the Commission has recently reissued the announcement of these opportunities for Government employment with slightly modified requirements. Salaries for the positions range from \$2,000 to \$5,600 a

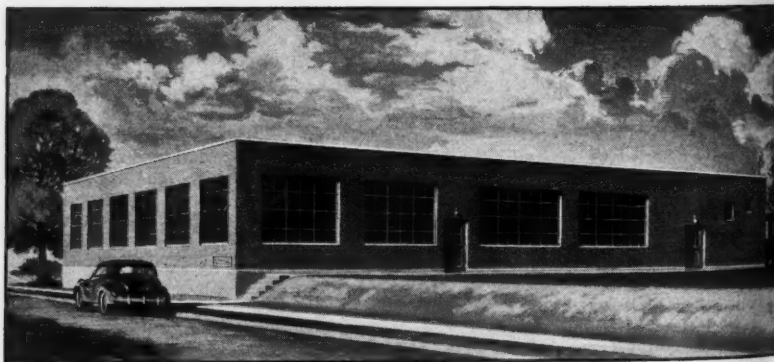
year. Applications may be filed with further notice with the Commission Washington office.

By technologist the Commission means a person experienced in "the necessary production, engineering, and scientific research work essential for the successful operation of an industrial plant where such plant operation is based upon a thorough and expert knowledge of a branch of an applied science," such as explosives, fuels, plastics, rubber, minerals, or textiles.

For the Junior positions (\$2,000 year), applicants will no longer have to take a written test, and, as before, a written test will be given for the higher positions. The maximum age limit for all the grades has been raised to 45 years.

Copies of the announcement (188), and the forms for applying, may be obtained at first- and second-class post offices, or from the Civil Service Commission, Washington, D. C.

**TO SERVE YOU BETTER --- NOW OPERATING PLANT No. 3  
AROUND THE CLOCK --- SEVEN DAYS**



**M. A. FORD MFG. CO.**

**HAND CUT ROTARY FILES**

**GROUND-FROM-THE-SOLID CUTTERS**

**DAVENPORT, IOWA**

filed with  
Commission

mission men  
e necessary  
and scientific  
the success  
industrial plan  
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(\$2,000)  
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C.



ID CUTTER

May, 1942

# Quality-Control Through Every Step!



-makes every PARKER-KALON  
SOCKET-SCREW as perfect  
as a screw can be made

PARKER-KALON'S Quality Control Laboratory - without counterpart in the screw making industry - stands guard over every P-K Socket Screw produced. This is your assurance of 100% dependability! "Doubtful Screws" - screws that look all right but some of which fail to work right - are eliminated.

Beginning with a careful analysis of the special alloy steel - strength factors, physical and working characteristics must surpass rigid specifications. Routine tests and inspections through every step of manufacture protect against all defects.

This protection may save you costly delays on the job - it's the big reason why essential industries specify Parker-Kalon Socket Screws on work that *must* keep moving! Parker-Kalon Corp., 198 Varick St., New York, N. Y.



*Quality-Controlled*

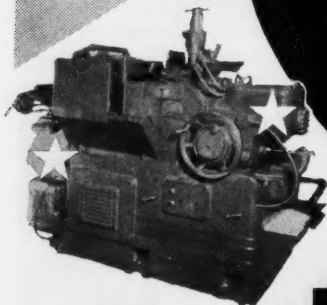
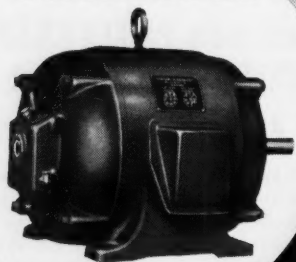
Complete test and inspection routine covering: Chemical Analysis, Strength, Ductility, Hardness, Head and Socket Dimensions, Thread precision.



**PARKER-KALON**  
*Quality-Controlled*  
**SOCKET SCREWS**

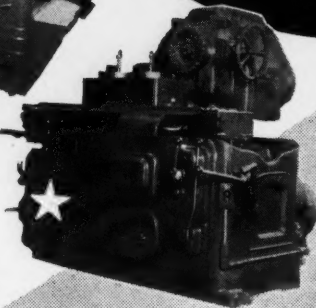
Give the Green Light to Defense Assemblies

# Quietly and Unseen - ★ Thousands of CENTURY MOTORS



One of the Largest Exclusive Motor and Generator Manufacturers in the World.

273



*are playing their part  
by producing smooth  
power for the precision  
production of war needs*

**H**idden from view in the streamlined bases of thousands of the most modern machine tools, Century Motors through their unusual freedom from vibration — are quietly contributing to more efficient production by making possible closer tolerances and consequently fewer rejects.

Built to stand the gaff of continuous, 3-shift, high speed production, Century Motors ask for no vacations or rest periods.

For a quick solution of any motor problem — get in touch with the nearest Century Motor Specialist. His wide experience in specialized motor application plus the wide range of Century sizes and types may save you time and trouble.

**CENTURY ELECTRIC CO.**  
1806 Pine Street, St. Louis, Missouri  
Offices and Stock Points in Principal Cities

# 25 HOLES IN 3 MINUTES, 54 SECONDS



## CP HICYCLE TOOL REAMS 1-1/6" HOLES THROUGH TWO 1-1/2" PLATES

### Maintenance Low Despite High Speed

NEW YORK — Typical of the high sustained speed of CP Hicycle Electric Tools is the performance of a CP Hicycle Reamer in an Eastern shipyard. Employed in deck reaming, a CP Hicycle reamed twenty-five 1-1/6" holes through two plates of 1-1/2" steel in 3 minutes, 54 seconds.

With their high sustained speeds and ability to stand up under the hardest service, CP Hicycle Drills, Reamers, Grinders, Nut Runners, Tappers, etc., are helping industry to record production.



↑ 500 HOLES PER HOUR is another Chicago Pneumatic Hicycle performance — with a forty per cent increase in production. Due to sustained speed, there was a big reduction in reamer bits broken,



## CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 9 East 44th Street, New York, N. Y.



↑ 1/4" HOLES IN 5/8" STEEL CASTING are easy work for a Chicago Pneumatic Hicycle Drill. Ruggedly built, all of the Chicago Pneumatic Hicycle Tools are designed for heavy duty service.

← HICYCLE INDUCTION MOTOR, indestructible rotor, no sliding parts, rugged construction, insure lowest maintenance cost of any type portable tool.

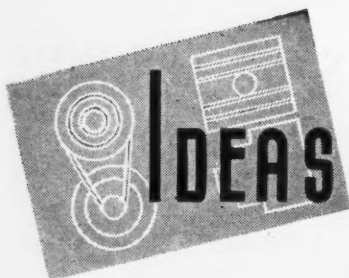
WITH THEIR HIGH SUSTAINED SPEED, Chicago Pneumatic Hicycle Grinders remove metal in a given time. Because Chicago Pneumatic Hicycle speeds do not fluctuate, the emery wheels last longer.



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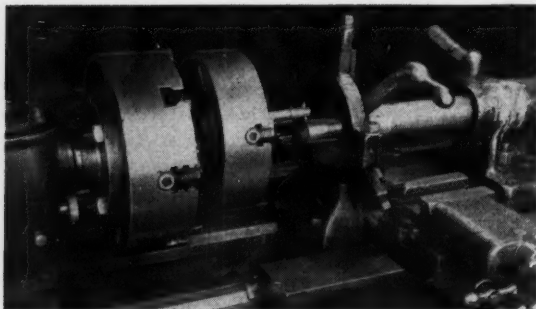
## IDEAS FROM READERS

### Machining a Large Piece in a Small Lathe

By LLOYD E. GILBERT

**B**EING limited as to capacity on the machine tools in the high school in which I am a machine shop instructor, we are often forced to use our ingenuity in order to get jobs done that are beyond the capacities of the machines. Such a job is described here.

The job consisted in machining a casting for a machine hand lever, the task being to turn, drill, bore, face, and counterbore the sleeve end by which the lever is attached to the machine of which it is a part. The operation would be simple enough with a lathe available large enough to swing the piece, but the length of the lever was much greater than the swing of any lathe in the shop.



We finally accomplished the task by holding the work in a steadyrest and chucking the cutting tools in the lathe chuck. The work was fed to the tool by clamping the steadyrest to the lathe bed just tightly enough so that it could be pushed with the carriage, feeding by hand or machine aided by pushing against the work with the tailstock so that all the pressure would not come on the gear in the apron.

The hole **A** was drilled and bored without much trouble. The counterbore **B** was machined and the surface **C** was faced by reaching through the hole with the tool holder and inserting the tool bit on the rear side of the work. To machine the counterbore it was necessary to wire the steadyrest to the carriage so that reverse feed could be obtained.

Examination of the picture will show that two chucks were used in the turning operation, which was necessary in order to get the tool holder far enough to the center so that the surface **E** could be turned. The jaws of the first, or large, chuck could not be

By Using Two Chucks as Shown Here, the Tool Holder Could Be Set Over Far Enough so that the Piece Could be Turned



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wings for Curtiss C-46 war planes.  
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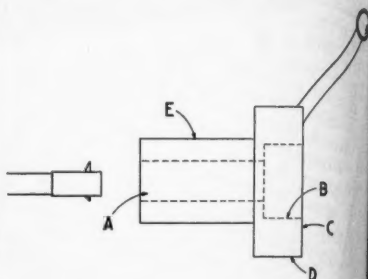
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over far enough, so a second chuck was used, the adapter plate of the second chuck being gripped by the jaws of the first. The second chuck was chucked as far off center as possible, then the jaws of the second chuck were also set off center, which allowed the tool holder to be set over the required amount for turning.

It was found that with the steady-rest clamped fairly tight to the ways a surprisingly smooth cut could be



Drawing of Lever Casting Showing Surfaces to be Machined

obtained. Considering the wear on the ways and the strain on the approach gears this method could not be recommended for frequent use, but as an emergency measure it serves well.

## Meddle-Proof Safety Controls

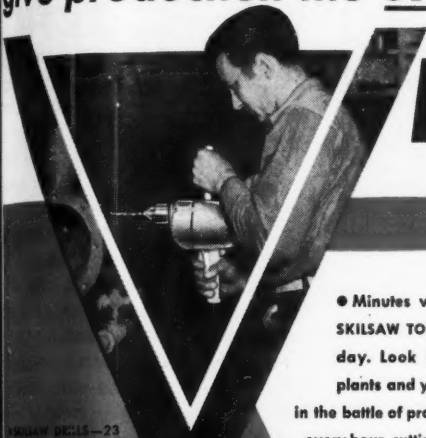
By CHAS. H. WILLEY

**T**HE effectiveness of a safety device on a machine tool is frequently nullified by an operator who in order to obtain more production or to reduce the number of hand or arm movements required, detaches the safety controls or removes the device altogether. This condition was found to exist in cases where safety controls had been applied to stamping

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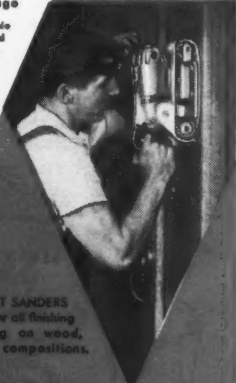
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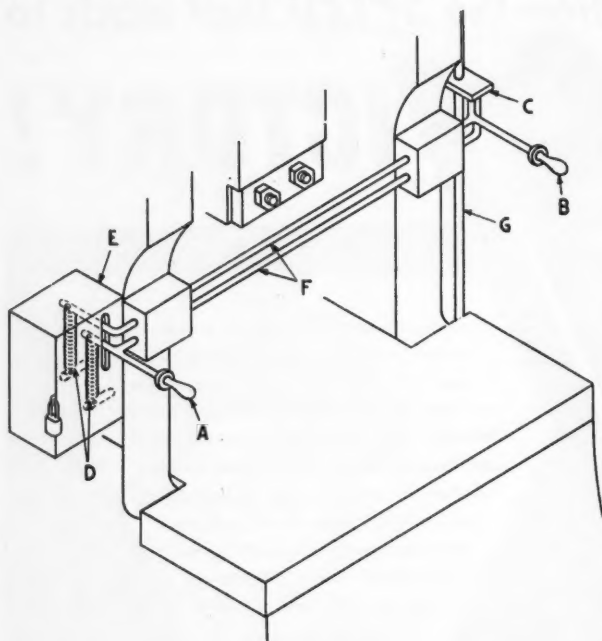
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## SKILSAW PORTABLE ELECTRIC TOOLS

★ MAKE AMERICA'S HANDS MORE PRODUCTIVE ★

ing presses, the safety device in each case consisting of a small horizontal plate anchored to the clutch rod in

the illustration, with the stop plate at C. Two shafts F are positioned horizontally across the machine, both



Meddle-Proof Safety Controls

such position that it is prevented from moving downward until two stops have been swung out of the way.

The clutch rod is indicated at G in

the illustration, with the stop plate at C. Two shafts F are positioned horizontally across the machine, both shafts having, at the right hand ends, vertical sections which prevent the stop plate C from being moved downward by the action of the foot pedal until the stops have been swung out of the way by movement of the levers A and B. A lever on each side of the machine ensures that both of the operator's hands will be out of the danger zone when the machine is in operation.

The clutch having been tripped, the levers are released and are pulled back into "safety" position by the action of the springs D in the sheet metal box E. The box is not essen-

tial to the operation of the safety device; it is only used so that the springs can be housed and locked to prevent any attempt on the part of the operator to disengage them. A



## "SKINS" SOLID OR STRANDED WIRE

The SPEEDEX Wire Stripper "skins" and cuts solid or stranded wire from No. 12 through No. 20.

Simply place wire in SPEEDEX jaws and squeeze handle! Wire is stripped quickly, smoothly and cleanly . . . no pulling.

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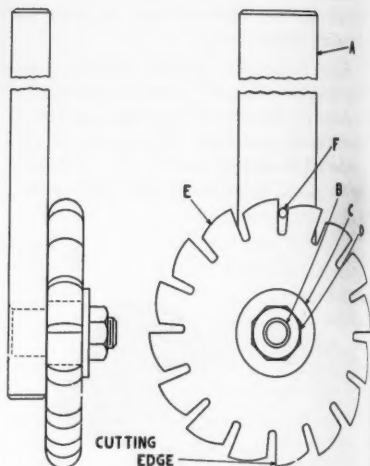
**Newark, N.J.**

padlock can be used on the door of the box, as shown.

## Emergency Radius Tool

By F. J. WILHELM

**I**F an assortment of radius milling cutters is available, a very good radius tool can be made on short notice. All that is required is a radius



Drawing Showing Use of Radius Milling Cutter for Radius Cutting in Lathe, Shaper or Planer

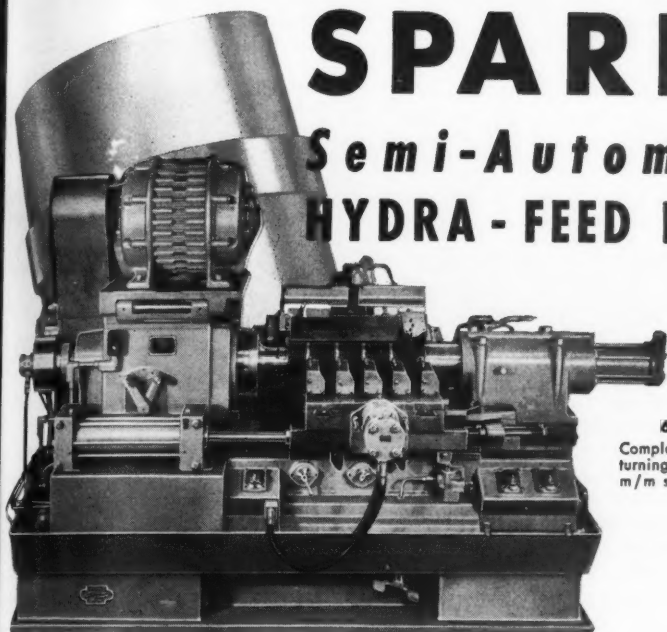
cutter of the correct size, a straight section of mild steel about 8 inches long, and a stud bolt or capscrew, nut, and washer.

The steel section, indicated at A in the drawing, should be of the correct size to fit the toolpost on the lathe in which the job is to be done. A hole should be drilled near one end to take the stud or capscrew, and the stud or screw should be pinned in place. A stop-pin, F, should be located in the bar at a point which will enable it to hold the cutter from revolving. Then the cutter E, the



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## Semi-Automatic HYDRA-FEED LATHE



**69 SECONDS**

Complete cycle of rough turning operation on 155 m/m shell shown on cut.

**for Machining All Sizes  
of SHELL BODIES  
from 75 m/m to 8" inclusive**

Shell forging is inserted in lathe, tailstock live spindle traversed hydraulically to locate shell on mandrel, at which time spindle automatically starts through hydraulically operated clutch. Carriage with slide controlled tools is moved hydraulically until outside of shell is completely turned. Simultaneously, rear slide tools are hydraulically moved into shell for facing base end and cut off open end to length. On completion of turning operation, pilot valve is automatically rotated by trip dog which puts feeds in rapid traverse to return carriage and rear slide to their starting positions. Spindle is stopped automatically in 2 seconds through hydraulically operated brake. Operation of foot-treadled valves mounted on floor release pressure on expanding mandrel and traverse tailstock spindle to permit quick recovery of turned shell.

Write for complete details covering operation and production features and specifications of this simply operated lathe.



**SPARKS MACHINE TOOL CORP.**  
NORWALK CONNECTICUT

MODERN MACHINE SHOP 175

stud **B**, washer **C** and nut **D** are assembled to the bar as shown.

Either a concave or convex cutter can be used and the tool can be used with the lathe, shaper, or planer. Such a tool has been used on tool work in our shop with very good results.

## Adjustable Chuck Board

By C. F. FITZ

**I**N order to handle our work without loss of time, our shop equipment includes several different sizes of chucks for each lathe. Some of these chucks are large, heavy, and hard to handle, especially when an operator is trying to thread one onto the spindle nose of a lathe. To eliminate this difficulty, save time, protect the ways of the lathe, and preclude the possibility of accidents, the chuck

board shown in the illustration was designed.

To use, the board is placed in posi-

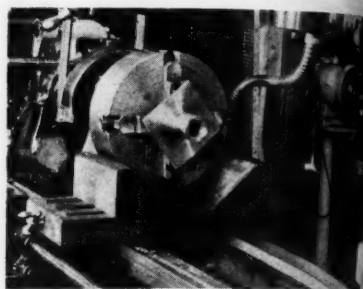
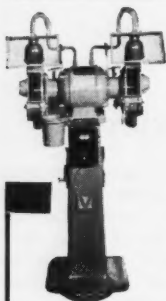


Fig. 1—Adjustable Chuck Board in Use

tion on the lathe-bed, the chuck is lifted onto the board, the screw in the board is revolved until the adjustable jaws have raised the chuck into line with the spindle-nose, and the chuck is threaded onto the spindle by the usual method of pulling



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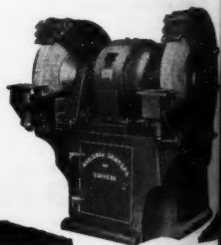
You will get the best offhand grinding results with dependable Marschke Grinders. Built to machine tool standards, Marschkes do the work and spare the wheel. Whether you need a 1 HP pedestal machine for tool grinding, or a 25 HP floor stand or swing frame snagger, there is a Marschke for your particular requirement. A Marschke will do your job more efficiently than any other machine of similar type—and save you money.

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*Not Just a Shallow Cutting Surface*

**INDIA Oilstone Files** — coarse, medium, fine — from top to bottom and side to side are tough and sharp. Their uniform size electric furnace cutting crystals fairly eat into steel.

Oil-impregnated at the factory, they cut fast, smooth, cool. They cannot overheat, scratch or damage your work.

**Hard Arkansas Files** (superfine only) for the supreme finish! They are indispensable in precision tool and die making and for accurate fitting of delicate parts.

This is 1942 — the year when *everything* counts. That's why we suggest that you say:

**"I want an OILSTONE File."**

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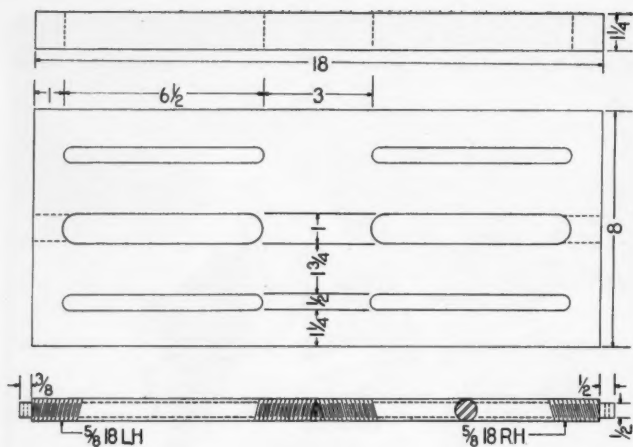


Fig. 2—Drawing of Chuck Board and Screw

the belt.

As shown by the drawings, Fig. 2 and 3, the board proper is 8 inches wide by 18 inches long and 1 1/4 inch

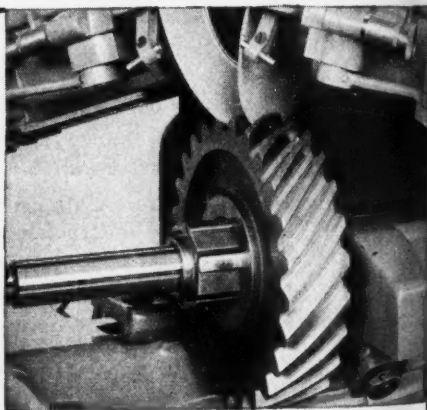
thick. Each jaw is 3 1/4 inches high. A hole through the center of the board, lengthwise, provides for the screw by which the jaws are fed toward or away from the center. The screw, which is threaded 1/8-in. 16 thread R. H. on one end and 1/8-in. L. H. on the other end, is held in alignment by two bushings, one at

each end of the screw. The bushings are made to fit into holes in the ends of the board and are bored and reamed to fit shoulders on the ends of

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Cut and ground on Maag Machines in our Jersey City plant to an accuracy of profile up to .00012" and to an accuracy of pitch up to .00024". Eccentricity of pitch circle, .00060".



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lengthwise,  
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the screw, where they are anchored with setscrews.

The jaws are maintained in align-

The pins are indicated at F in Fig. 4. Also projecting downward from the center of the bottom face of each

jaw is the part D, which is threaded to screw into a hole in the bottom of the jaw and is drilled and threaded to fit the thread on the screw. Thus when the screw is revolved by the crank handle E, the jaws are fed toward or away from each other.

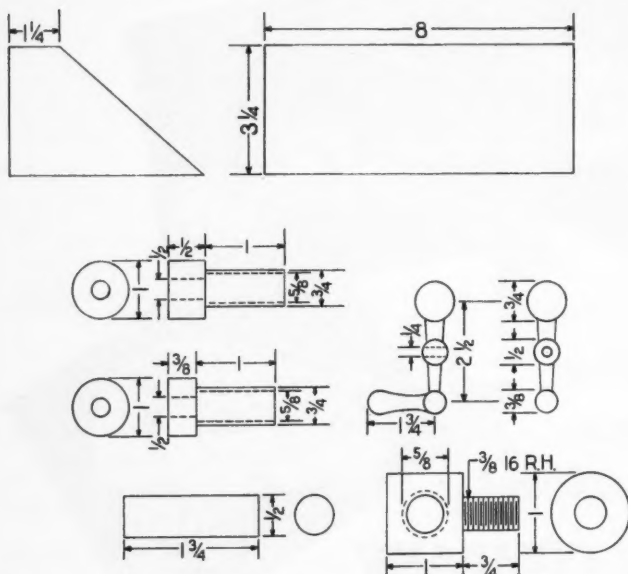


Fig. 3—Details of Chuck Board Parts

ment by two pins in the under side of each jaw, the pins projecting downward into slots in the board.

**T**HE National Steel Car Corporation of Hamilton, Ontario, has for some time been producing shells of

## Home-Made Chip Breaker

By ROBERT WAGNER

Hobart Brothers Co.,  
Troy, Ohio

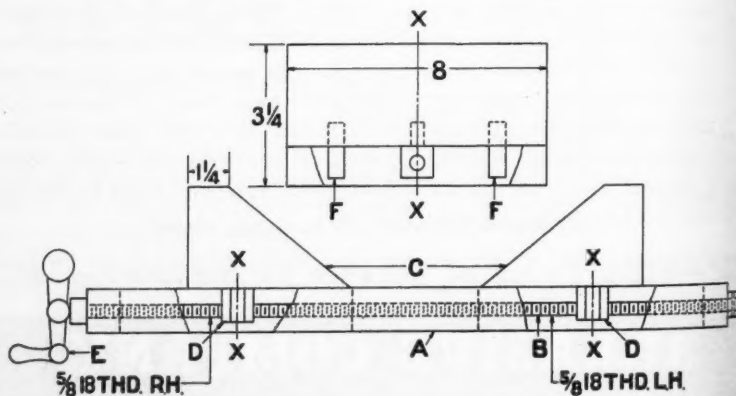
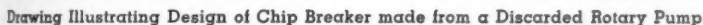


Fig. 4—Assembly Drawing of Adjustable Chuck Board



ar Corpora  
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able scrap breaker could be found, so the company decided to make its own. A discarded rotary pump, bought at a cheap price at a local scrap yard, served for the main unit.



After some experimenting we discovered that the cuttings, due to their high carbon content, would break if bent to a 45-degree angle, and further experimentation proved that the chips could be bent by running them through gears. No suit-

To convert the pump into a chip breaker, the rotors were replaced by gears. The gears were made by cutting two pieces of standard 10-inch pipe to 36-inch lengths, and then welding 1 x 1/2 x 36-inch steel bars around the periphery of each bar to serve as teeth. A hard surfacing bead was then applied to the top of each tooth to aid in resisting wear. The teeth were arranged in parallel and evenly spaced, as shown.

Cuts wire or rod up to  $\frac{1}{8}$  inch  
band ( $\frac{1}{8}$  inch square) and band  
on up to  $\frac{1}{8}$  by 2 inches.  
Adjustable stop for repeated cuts  
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Powerful leverage makes all cuts  
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To prevent distortion and give each gear added resistance and provide the shaft hubs, two 10-inch steel discs were welded inside each gear at a point 14 inches from each end. Hubs 4 inches long were cut from 6-inch round steel, then each hub was bored to fit the pump rotor shaft and a keyway was cut as shown. The hubs were held in place by four pieces of 2 x 4 x 1/2-inch mild steel welded together.

The necessary hopper was built of 1/4-inch steel plate, arc welded together and bolted to the top of the pump housing. The breaker was mounted on an angle iron frame about 18 inches high so that the broken chips could be shoveled from underneath. Power was supplied by a 7 1/2 h.p. motor which has been geared down to 80 to 90 revolutions per minute.

The machine proved so successful that three more were made, the

largest being 8 feet high, with gears 22 x 84 inches in size. All welding equipment used on this job was manufactured by Hobart Brothers Company.

### Liquid Air Used in Assembling

The shaft connecting the turbine to the generator on each of the 108,000 h.p. units at the Grand Coulee dam is 48 inches in diameter and 73 feet long, the length being made up in three sections. The sections are joined by 75-inch flanges fitted with ground oversize bolts.

These bolts are shrunk by means of dry ice before being put into place. They can be shrunk for removal by passing liquid air through axial holes provided in the bolts for that purpose.

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INCREASED PRODUCTION  
SIMPLIFICATION OF MODELS

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to plants that can furnish preference ratings and to mechanics who can fill in our simple form, proving that they are working for defense.

In order to meet the tremendous demand among thousands of mechanics for micrometers, the REED factory is temporarily devoting its entire production to the following four models.

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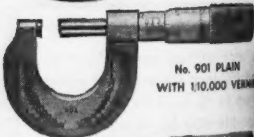
No. 802 plain	List \$ 7.00
No. 802 plain with 1/10000" vernier	List \$ 8.75

SEND IN YOUR ORDER OR WRITE FOR FOLDER

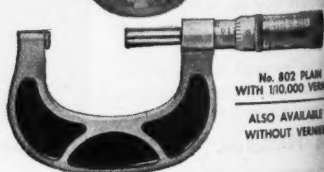
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No. 801 PLAIN



No. 901 PLAIN  
WITH 1/10,000 VERNIER



No. 802 PLAIN  
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ALSO AVAILABLE  
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To Finish The Job Quicker . . .



TYPE-C  
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MACHINE A



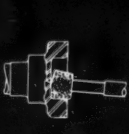
TYPE-C  
HYDRAULIC  
UNIVERSAL  
MACHINE A



TYPE-C  
HYDRAULIC  
UNIVERSAL  
MACHINE B



TYPE-C  
HYDRAULIC  
UNIVERSAL  
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TYPE-C  
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TYPE-C  
HYDRAULIC  
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## MAKE YOUR GRINDERS DO "DOUBLE DUTY" LIKE THESE

Suppose you wanted to grind shafts such as the one shown above. Suppose that in grinding this shaft "speed in production," and close concentricity between the ground surfaces" were two important requirements.

One manufacturer was faced with this problem. He installed two Landis Type C Hydraulic Universals. Using only these two machines all of the above illustrated operations are performed. On machine A a diameter, a radius and an adjoining face are external ground with one wheel, while on other diameter, a radius and an adjoining shoulder are external ground on the same machine with a different wheel. Machine B is used to external grind the inside radius, the O.D. and the face of a flange with the same wheel. In addition the same machine is used to grind inside diameter, the inside radius and face, and the radius

at the entrance of the counterbore in the flange. Two grinding wheels are used.

Thus both important requirements are fulfilled. Because the Universal wheel base can be swiveled with ease and because it requires but little time to change over from an external to an internal set-up and vice versa, rapid production is obtained. Since only two machines are used, the surfaces are held closely concentric.

If you are confronted with a problem involving rapid production, call in a Landis representative. Surely, from among the many types and sizes of grinding machines offered by Landis, the correct machine for your job can be found.

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As Usual

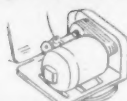


LANDIS TOOL CO.

WAYNESBORO, PENNSYLVANIA



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WHEEL SPINDLE  
BEARINGS



COMPACT  
MULTI-SPEED  
HEADSTOCK



MULTI-SPEED  
HYDRAULIC  
TABLE  
TRAVERSE

# Sound Film on Tool-Grinding Technique Available

A staff of instructors specially trained in the technique of grinding and setting cutting tools will be made available to conduct a one-hour program on the subject in metal-working plants and training institutions all over the country, it is announced by The Warner & Swasey Company, Cleveland, turret lathe builders.

The program, designed to be given in plant meeting rooms at change of shifts or at other hours convenient to operators and trainees, will feature unusually interesting high-speed sound moving pictures which slow up and magnify metal-turning operations and thus reveal the secrets of cutting tools in action. A new service of the company's Turret Lathe Operators' Service Bureau, the instructors and film will be available upon request without charge.

"Wherever our instructors have gone, the predominant questions have been about the grinding and setting of cutters," explains Walter K. Bailey, Warner

& Swasey vice president. "That is the reason we decided to launch the course which is devoted to this subject exclusively."

In addition to the sound film, the instructors will use model tools, giant magnifying cutters, and charts, and will distribute to the operators who attend the program a 16-page illustrated booklet which highlights the fundamentals of the instruction.

The sound film, which is entitled "Chips," shows at 1/100th actual cutting speed exactly what happens when a cutter is ground correctly and what happens when it is ground incorrectly. It also includes instruction in the use of chip grooves, in how to control size and length of chips, the function of cooling, and the advantages of honing cutters.

Information regarding the film and instructor can be obtained by writing Mr. W. K. Bailey, Vice President, Warner & Swasey Company, Cleveland, Ohio.

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## Conservation Control Plan Offered

Henry Disston & Sons, Inc., Philadelphia, Pa., is now offering to Industrial America an effective Conservation Control Plan of wide scope designed to save vital materials and to speed up production during the present national emergency.

Based upon instruction cards known as "Conservation Control Cards," the individual worker is told how to handle a particular tool, how to use it efficiently, how to keep it from breaking, how to sharpen it, and other important information which will enable him to do his work easier and better. There are 35 of these cards, covering cutting tools for metal, wood, plastics, and so on, including tool bits, files, hack saw blades, Carbide knives and cutters, circular metal and wood-cutting saws, band saws for wood or metal, planer knives, and so on.

Conservation Control Cards are sup-

plied free to any plant along with letters bearing a seal and the slogan "Conservation Serves Everyone." In addition, posters are available for the use of plants generally which emphasize the idea to men as a means where their work will be made easier and better. Emphasis is placed on the importance of saving materials in order to make more materials available during this time of emergency and shortages.

---

"Yes! All Metal War Products Can Be Cleaned" is the title of a Visual Folder now being issued by The Al Ferguson Co., 777E Disney St., Cincinnati, Ohio, describing A-F machine washing, rinsing, and drying of shell fuses, cartridges, bombs, machine gun barrels, rifle parts, cartridge cases and other metal armament products. Copy free to executives addressing a request on their company letterhead.

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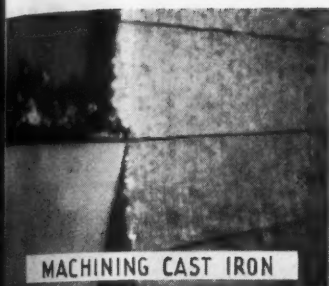
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MACHINING CAST IRON



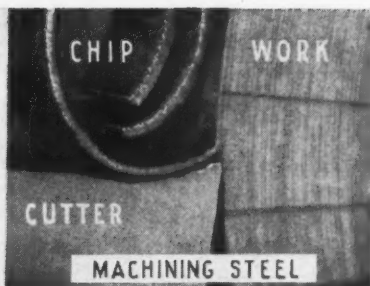
MACHINING BRASS



INSUFFICIENT TOP RAKE



DULL CUTTER



MACHINING STEEL



ACTION OF COOLANT



CORRECT TOP RAKE

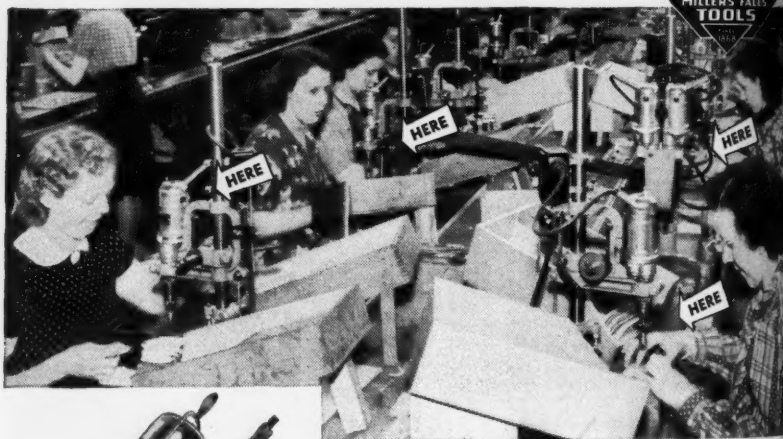


SHARP CUTTER

Super-Slow-Motion Close-Ups Showing Operation of Metal-Turning Cutters from the Moving Picture "Chips," Feature of the Warner & Swasey Company's New Training Program on the Grinding and Setting of Cutting Tools. Distance Between Marks on Workpiece is Approximately  $\frac{1}{8}$  Inch.

# "WORK SIMPLIFICATION" and SPEED-UP begin here

For the vastly increased production now called for under the Victory program, industry is looking to "work simplification" and speed-up . . . largely a process of adding the *right* electric tools in the *right* places, through careful job analysis. In the foreground of such planning in thousands of plants are Millers Falls portable electric tools, built for trouble-free service on dozens of repetitive operations. Millers Falls drills, nut runners, screw drivers, grinders, sanders, and hammers — well-spotted, applied according to plan — are saving precious time, cutting production cost. ✓ ✓ **Work-simplification-and-speed-up** — long a Millers Falls *selling* slant, now our customers' *buying* slant — is paying the country dividends.



"Built-in experience" distinguishes Millers Falls electric screw driver No. 50; by that we mean its "Adjustable clutch," which lets inexperienced operators work rapidly setting up screws to **pre-selected** tension. Weight 10 lbs.; full range of speeds; AC or DC.

## MILLERS FALLS COMPANY

Greenfield, Mass.

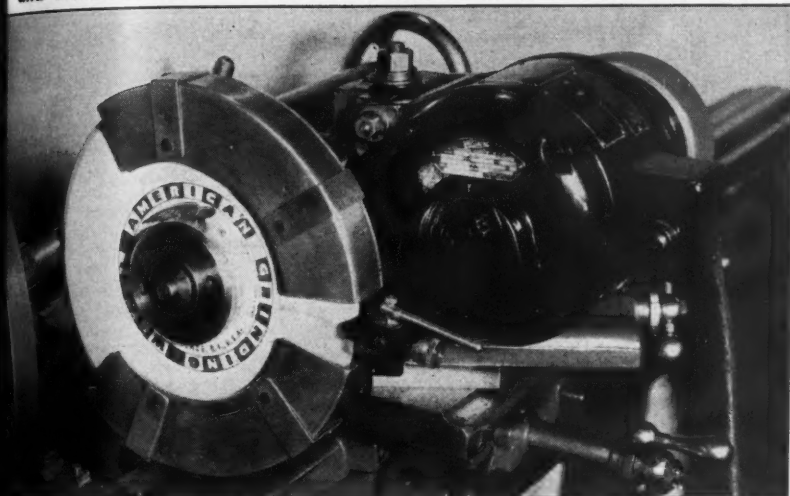
Manufacturers of FINE HAND TOOLS, PRECISION TOOLS, PORTABLE ELECTRIC TOOLS, and HACK Saws



# ON SUPER-PRECISION GRINDERS

For LATHES, SHAPERS, MILLING and BORING MACHINES

Full Line of Portable Precision Grinders that Produce a Finish and Accuracy Not Before Attainable with a Portable Tool



Model M 1 H.P. Grinder with thread dressing attachment

## BALL BEARING SPINDLE

Our Super-Precision Grinders are built around a Ball Bearing Spindle of new design, developed by years of research and experimentation. It is manufactured to the closest tolerances for balance and accuracy that mechanical skill can produce. As a result, the finish produced by this portable grinder compares favorably with that produced by a large cylindrical grinding machine.

## THREAD GRINDING

An important feature of our grinders is that they are built to grind threads efficiently and accurately. A dressing attachment can be supplied to form any thread form. Threads like on taps and thread gauges, can be ground full depth from

the solid after the part is hardened practically as fast as they can be cut with a tool in the soft steel, and to far greater accuracy and better finish.

## 3 STANDARD SIZES

$\frac{1}{3}$  H.P. Motor. For wheels up to 6" dia.

$\frac{1}{2}$  H.P. Motor. For wheels up to 6" dia.

1 H.P. Motor. For wheels up to 10" dia.

EXTRA LONG QUILLS FOR GRINDING DEEP HOLES ARE AVAILABLE IN 8", 12" and 18" LENGTHS.

## BALL BEARING SPINDLES

We manufacture high precision ball bearing spindles for all makes and types of machine tools. Also special grinding machines equipped with our famous ball bearing spindles.

**GENERAL MACHINE TOOL CO.**

**• SENECA FALLS  
NEW YORK**

MODERN MACHINE SHOP 191

May, 1942



## Landis Machine Company Builds New Plant Addition

Presented here is the new addition to the plant of the Landis Machine Company, Waynesboro, Pennsylvania, which has just been completed. The addition includes a structure 60 x 350 feet, a wing 50 x 80 feet, and a second building 30 x 60 feet in size. The large structure will house a new erecting floor and shipping department, the wing will house a box and crate manufacturing department and lumber storage, and the

smaller building will provide for the storage of chips and scrap metal.

Built of brick, concrete and steel, the new structure will add approximately 25,000 square feet of floor area to the plant. The new erection floor further provides a modern, well-lighted place for the erecting and assembling operations on the Landis Precision Thread Grinder which the company recently announced that it would manufacture in addition to its line of thread cutting machines, thread-cutting die heads, and collapsible taps.

## Films Available on "Steelmaking"

Motion pictures said to be of great value in training courses throughout the United States in which thousands of workers are fitting themselves for National Defense jobs have been produced by the United States Steel Corporation of Delaware, 208 S. LaSalle St., Chicago, Ill., and its subsidiary companies. According to the producers, the value of these films in the training of men destined to engage in the production of battleships, tanks, guns, and airplanes is indicated by the increasing number of requests received from companies conducting employee training programs as well as from state and federal agencies supervising the development of skilled workmen for National Defense. In addition to the immediate Defense Program, United States Steel films are being widely used by schools, colleges, technical societies, and so on.

"The Making and Shaping of Steel," one of the most recent films to be re-

leased, tells the story of steelmaking in seven reels from the time the ore is mined until the finished product leaves the mills. Scenes for this picture were taken in many plants of United States Steel subsidiaries.

To facilitate distribution, film centers are located in company offices in New York, Chicago, Pittsburgh, Cleveland, Birmingham, and San Francisco. No charge is made for the use of films.

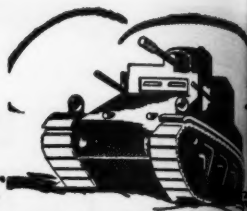
**American Gage Design Standards.** 16-page catalog on American Gage Design Standards has been issued by the Lincoln Park Tool & Gage Co., Lincoln Park, Mich. The catalog contains material compiled from information published by the National Bureau of Standards, U. S. Department of Commerce, and which is essentially of interest to inspection men and engineers. Copy free upon receipt of a request addressed on a company letterhead.

**SPARTAN BLADES**  
*lend a hand  
 to Offense!*



● Spartan Hack Saw Blades are lending a helping hand to industry's battle of production. They're armed to the teeth to help industry slap the Jap off the map. Spartan Kutall Blades are made of Molybdenum Special Alloy High Speed Steel, are heat-treated by the special Spartan process, and are fast and tough. Spartan offers five special types of Hack Saw Blades, also Band Saws. See your distributor today.

**SPARTAN SAW WORKS, INC., SPRINGFIELD, MASS.**



## Tools For National Defense

### Landmaco Shell Boring Machine

Designed to provide an efficient and accurate means for removing the excess metal within the bore of the nose end of various size shells on a production basis, the Landmaco Shell Boring Machine shown in the accompanying illustration has been introduced by the Landis Machine Co., Waynesboro, Pennsylvania.

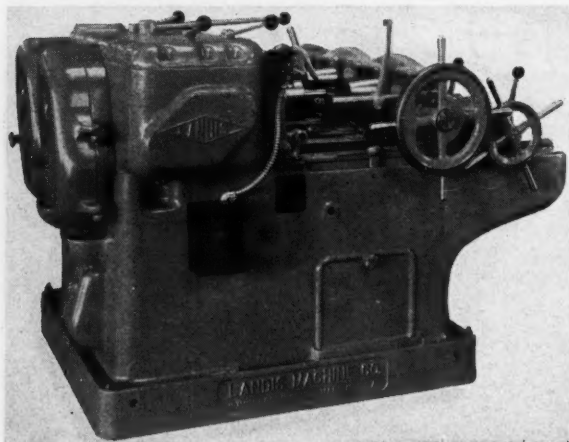
In setting up the machine for handling shells, a special adapter which supports a boring tool of the replaceable bit type is held in the head. Special round serrated grips are used for supporting the work in accurate alignment with the center of rotation of the machine spindle. In addition, a special work support or cradle is located directly back of the carriage front or vise of the machine to align the work with the

work grips and to facilitate handling the work. A hand-operated work rest is employed to locate the work in relation to the boring tool and to insure uniform gripping of all workpieces. A lead screw is provided for in-feed of work to the boring tool.

### Leiman Shell Sandblast Machine

An automatic, compact sandblast machine designed to process a large quantity of work in a minimum of time has been developed by Leiman Bros., Inc., 111 Christie St., Newark, N. J. It is said to be especially adapted for the sandblasting cleaning of shells.

The machine is equipped with a rotating table on which the work is held for processing. The table extends into the interior of the machine so that the portion of one side of the table can be processed while the other side, being outside the machine, is being loaded. Power to drive the table is supplied by a motor the speed of which can easily and quickly be changed to suit the work.

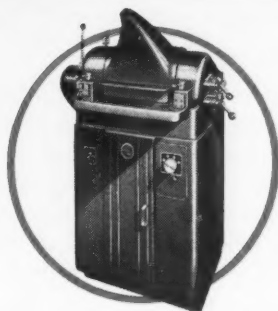


Landmaco Shell Boring Machine

ONLY THE EAR CAN DETECT NOISY GEARS

# RED RING GEAR SPEEDER

*Provides*  
More Effective  
Lower Cost  
Listening

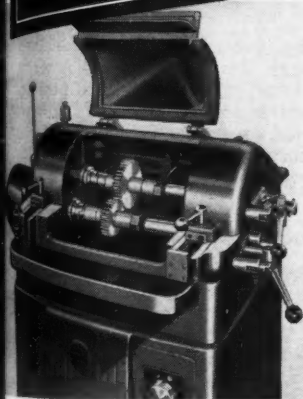


It costs too much to assemble gears in a transmission or other assembly, then have to reject them for noise.

The Red Ring Gear Speeder provides a simple, easy, low cost method of checking gears for noise—before assembly.

It is a listening device—easy to operate—and may be used anywhere—needs no soundproof room. Gears are mounted in pairs on spindles and are run at appropriate speeds. The operator places his ear at the mouth of the acoustical horn. The horn magnifies the sound of the gears 50 times—making objectionable noise easily detectable.

Various set-ups are available—you can get a Red Ring Speeder for spur or helical gears.



Write for Bulletin

SPECIALISTS ON SPUR AND HELICAL  
INVOLUTE GEAR PRACTICE

ORIGINATORS OF ROTARY SHAVING  
AND ELLIPTOID TOOTH FORMS

## NATIONAL BROACH AND MACHINE CO.

RED RING PRODUCTS

5600 ST. JEAN-DETROIT, MICH.

## CRYSTOLON LAPPING COMPOUNDS

Made expressly for use on  
**NORTON LAPPING MACHINES**

These compounds contain Norton Company's CRYSTOLON, (TM Reg. U. S. Pat. Office), that sharp cutting abrasive for hardened metal and alloy parts — aluminum.

The abrasive is suspended in a composition oil and grease base that was developed expressly for lapping; mixes readily with sperm, spindle, mineral seal, linseed, kerosene, olive oils, etc. Heavy lubricating oils not recommended.

### Grade No. 1020 Coarse

" No. 2030 Medium

" No. 3040 Fine

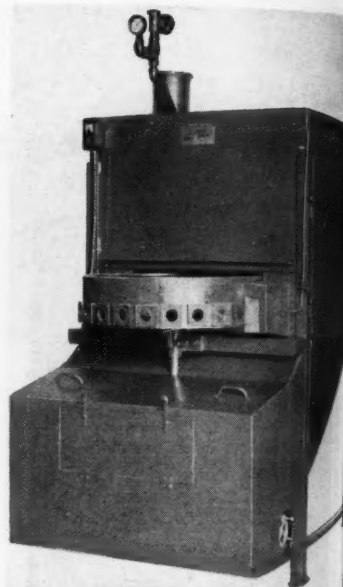
" No. A } 600 Crystolon  
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" No. A } 600 Alundum  
" No. B }

Lapped parts clean readily with solvent oils.

**Samples upon request.**

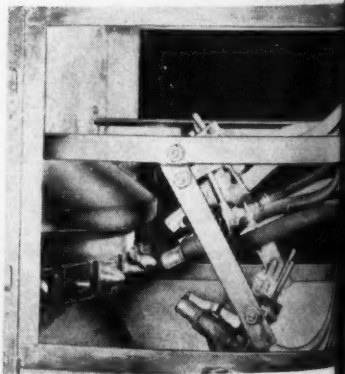
**UNITED STATES PRODUCTS CO.**  
728 FILBERT ST.  
PITTSBURGH PENNSYLVANIA



Leiman Shell Sandblast Machine

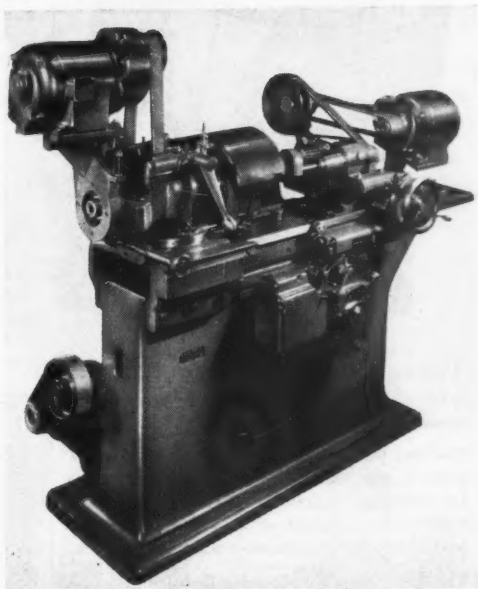
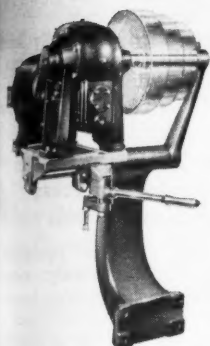
The sand is directed at the work through a number of nozzles which may be adjusted to any desired position. The actual sandblast operation is, of course, carried on inside the cabinet so that the abrasive or dust can get outside to clear the operator or adjacent equipment.

View Showing Interior of Leiman Shell Sandblast Machine and Arrangement of Nozzles





# ELECTRIFY YOUR HEALD, NORTON, CINGINNATI and RIVETT GRINDERS by Attaching **MASTERDRIVES**



Machine

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MASTERDRIVES are specially en-  
gineered for grinders. Simple to  
attach, operate and maintain. They  
offer the benefits of new electrified  
equipment at used machinery cost.  
increase tool efficiency . . . end  
meshaft hazards and limitations  
.. minimize belt lengths and fail-  
ures . . . permit full flexibility in  
plant layout. MASTERDRIVES FOR  
GRINDERS are part of our 550 tool-drive speci-  
fications . . . each powered by Master Gear  
Lead Motor . . . each engineered and guaran-  
teed as a single, COMPLETE installation.

We'll send name of  
**NEAREST  
REPRESENTATIVE**

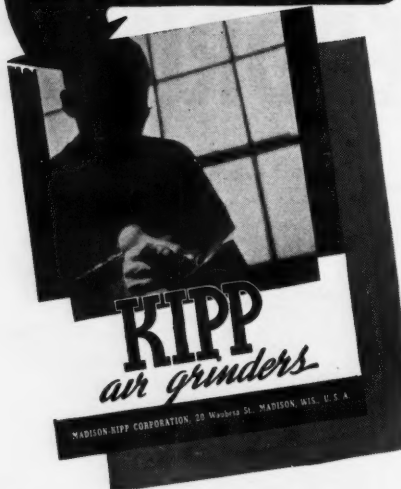
and latest Masterdrive literature.

**WRITE TODAY !**

# MASTER Electric Company

INDUSTRIAL EQUIPMENT DIVISION • DAYTON, OHIO

SEND FOR  
**FREE CATALOG**  
JUST OFF THE PRESS



**THE** Kipp Air Tool Catalog has always been in great demand because it is an "open book"—easy to understand and factual.

The 1942 Catalog now available is to a degree a War issue. One new super model H grinder, for instance, replaces several former models both in the interest of conservation and of better service to industries engaged in war work.

The 1942 Kipp Air Grinder Catalog is yours for the asking.

## GRIND **KIPP** WHEELS

AND OTHER TIME-SAVING POPULAR AIR TOOL ACCESSORIES

Kipp Air Tools give you highest speeds, lowest prices and have proved indispensable in thousands of tool rooms and production departments. Please attach preference rating certificate with order. Model H Grinder sells at \$29.75, Model K \$39.75 and Model VT \$49.75. U.S.A. Prices. F.O.B. Madison.

**MADISON-KIPP CORPORATION**  
202 WAUBESA ST., MADISON, WIS., U.S.A.

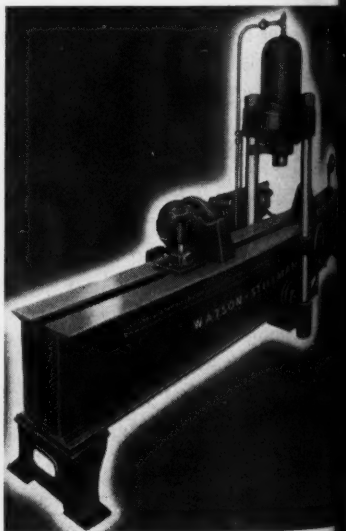
A slotted multiple rubber curtain prevents any of the abrasive from being blown out while at the same time a suction blower—which may be in any location—draws the dust from the interior of the machine, thus preventing any tendency of the dust to blow out.

The machine may be equipped with two or more nozzles, which may be set at the required angles. The nozzles are the suction type, and draw the sand and abrasive from a receptacle in the bottom of the machine. After the sand has been blown through the nozzles, it drops to the bottom of the machine to be drawn up by suction and used over again.

Although designed especially for the cleaning of shells, the machine can be used for a wide variety of work. It requires but a small amount of floor space.

## **Watson-Stillman 125-Ton Straightening Press for Gun Barrels**

An improved 125-ton straightening press embodying extremely sensitive control by a single hand lever has been developed by The Watson-Stillman Co., Roselle, N. J., for use in straightening gun barrels. The press is also suitable

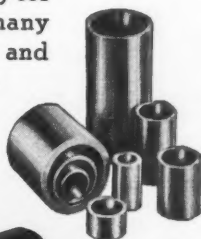
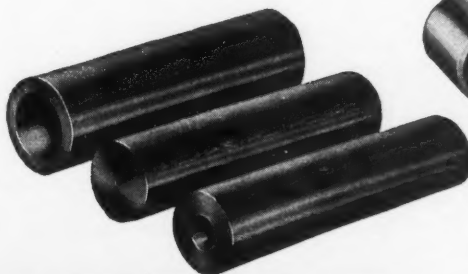


Watson-Stillman 125-Ton Straightening Press

# Quick Bearing Replacement For War Industries Machinery

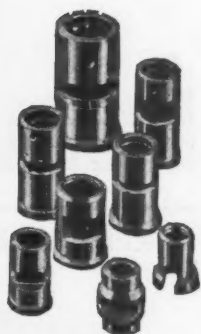
New bearings for machine tools, electric motors, industrial machinery all kinds are quickly and economically provided by Bunting Bronze Standardized Bearings available in hundreds of different sizes. These bearings are completely machined and finished—ready for assembly. They are used as original equipment by many leading machinery builders. Ample stocks of these and Bunting Precision Bearing Bronze Bars are maintained

by Bunting local  
wholesalers. Write  
for catalog. The  
Bunting Brass &  
Bronze Company,  
Cleveland, Ohio . . .  
warehouses in All  
Principal Cities.



Bunting Bronze Standardized Bearings provide bores from  $\frac{1}{8}$ " to 4", outside diameters from  $\frac{1}{8}$ " to  $4\frac{1}{2}$ " and lengths from  $\frac{1}{2}$ " to 9".

# BUNTING



Bunting Bronze Electric Motor Bearings are ready for assembly without further machining... Available from stock for practically every make and size of motor.

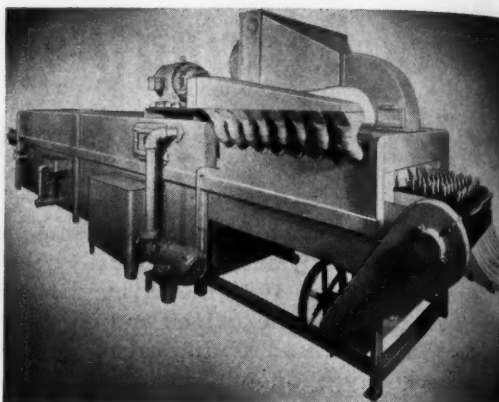
**BRONZE BUSHINGS • BEARINGS**  
**PRECISION BRONZE BARS • BABBITT METALS**

### A-F Product Washing Machine

for straightening shafting, forgings, and so on, the machine having a space between columns of 18 inches, vertical opening of 17½ inches, and stroke of 10 inches.

The unit is of the manually movable press type, a handwheel controlling movement of the press along the table, which is 14 feet long x 17 inches wide and equipped with bending blocks, centers, and rollers. Advance speed of the machine is 87 inches per minute, pressing speed, 13½ inches per minute, and return speed, 78 inches per minute.

The entire unit weighs approximately 7,500 lb., is 10 feet high, and requires a 14 x 5-foot floor space. The machine is powered by a radial pump with servomotor control, delivering 36 gallons per minute at 200 lb. per square inch and 5.5 gallons per minute at 2,650 lb. per square inch. The pump is driven by a 7½ h.p. motor.



### A-F Product Washing Machine

The slow, time-consuming, costly method of "dunking" shells in tanks of boiling solution by means of racks, lifting the racks, lowering them into rinse

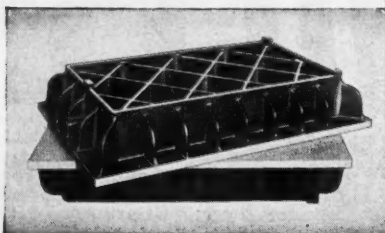
tanks, then placing them over a drain section and blowing off the excess moisture by means of compressed air, has, it is claimed, now been made obsolete by the A-F Product Washing Machine shown herewith, product of The Alvey-Ferguson Co., 777-E Disney St. Cincinnati, Ohio.

Especially designed to remove grease and chips from and dry 20, 37, or 44 mm. shells, this machine is an integral part of the production line. A feature of the unit is the automatic ejection of shells.

### DeVilbiss Automatic Painting Machine for Small Parts

A machine for automatically painting small shells and shell parts has been developed by The DeVilbiss Co., 300 Phillips Ave., Toledo, Ohio. The machine

### REID MASTER PLATES



### A NECESSITY IN EVERY PLANT WHERE ACCURACY IS DESIRED

THOROUGHLY NORMALIZED and WEATHER SEASONED. PLANED and SCRAPED on 3-POINT BEARING on which they will rest in use. GUARANTEED ACCURACY within .0001 on a 24" x 36" size. AVAILABLE PLANED and SCRAPED in standard sizes 12"x18" to 36"x42". THE ONLY PLATE that has a 50% trade value when purchasing a new REID plate.

Prompt delivery on priority orders.

**Tool Engineering Service Co., Inc.**  
241 Washington Ave. Nutley, N. J.

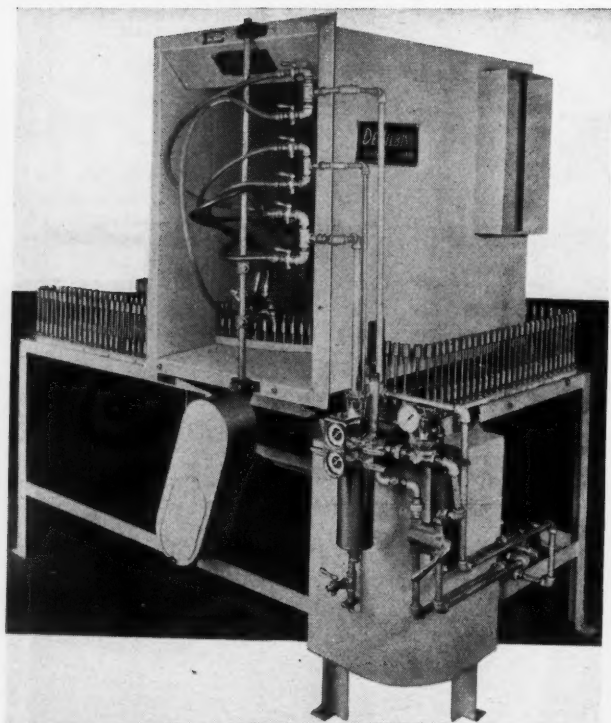
# "ROCKWELL" *Superficial* HARDNESS TESTER



One of the jobs that women are doing in war production is the operation of "ROCKWELL" Hardness Testers.

**WILSON**  
MECHANICAL INSTRUMENT CO. INC.

Concord Ave. & 143rd St.  
New York



DeVilbiss Automatic  
Painting Machine  
for Small Shells

shells per hour. Spindles for supporting the shells are of the removable type and are equipped with ball surface pulleys for rotation inside the spray booth. Spindle rotation is obtained by means of a separate variable speed drive. Work holders for the shells are mounted on the spindles.

Spray guns are of the automatic air pistol type with adjustable cam-operated spray control. The 10-gal. pressure feed paint tank is equipped with an automatic air pistol, exhaust fan, air transformer and the necessary air and fluid hose, control valve fittings, and connections complete for the machine.

Machines of this type are now in use in the painting of the several classifications of 20 mm. shells, 20 mm. projectile shot, and 20 mm. fuses and fuse bolts.

shown in the illustration is designed to coat the exterior of 20 mm. shells at a rate of 2,000 per hour.

The machine is built around a "chain-on-edge" variable speed conveyor which is of sufficient length to allow for a 10-minute drying time at a production rate of 1,000 shells per hour or five-minute drying time at a production rate of 2,000

## BANDSAW GUIDES REDUCE BREAKAGE

The bugaboo of bandsaw users is considerably reduced with ball bearing guides. Gain greater efficiency at lower cost with less hazard. For machines with blades  $\frac{1}{8}$  to  $1\frac{1}{2}$ " wide.

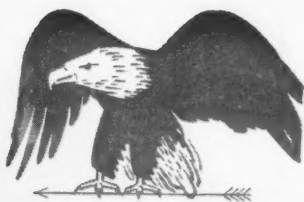
Shipped on approval—Write for details.

**PADDOCK TOOL CO.**  
Established 1920

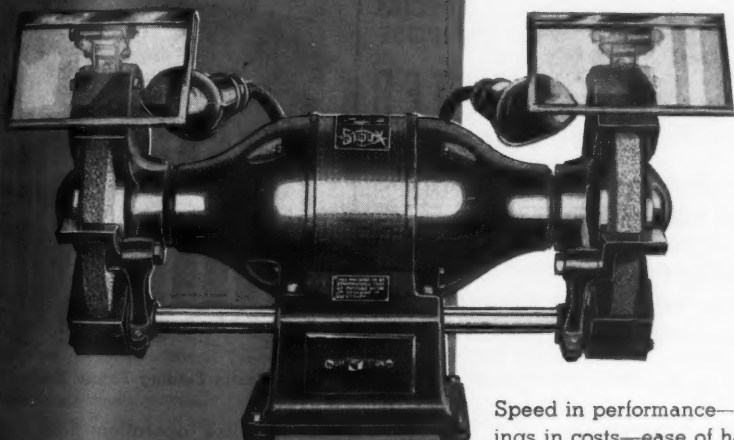
1418 WALNUT ST.  
KANSAS CITY, MO.



**GOOD CRAFTSMANSHIP  
PLUS GOOD TOOLS**



**For Defense Production**



Speed in performance—sav-  
ings in costs—ease of hand-  
ling—long and continuous  
service is the story of SIOUX  
Quality TOOLS.

**Bench Grinders, 6 models**  
**Electric Drills, 20 models**  
**Flexible Shafts, 10 models**  
**Portable Electric Grinders,**  
**3 models**  
**Portable Electric Sanders,**  
**4 models**  
**Portable Electric Polishers,**  
**2 models**  
**Phenol Abrasive Discs**  
**Grinding Wheels**  
**Wire Wheel Brushes, etc.**

Ask Your SIOUX Distributor or  
write for further information.

**SIOUX  
TOOLS**

STANDARD THE

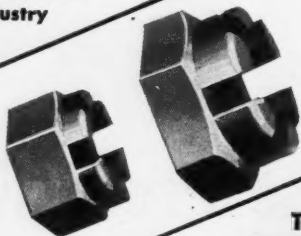
STANTON & CO., INC.



WORLD OVER

SIOUX CITY, IOWA, U.S.A.

Accepted by  
the Aircraft  
Industry



THIS  
SPECIAL  
PURPOSE

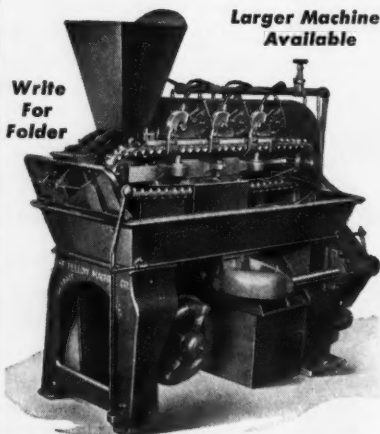
## NUT SLOTTER

OFFERS YOU:

- 6 CUTTERS MILLING CONSTANTLY . . .
- 2 CONVEYORS RUNNING CONTINUOUSLY . . .
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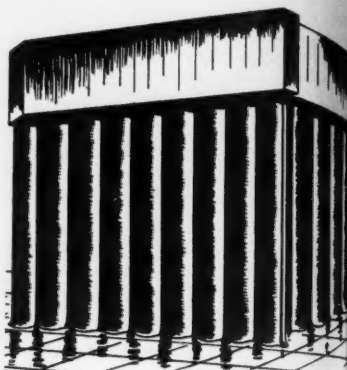


### PELLOW MACHINE CO.

13502 FOLEY AVE. DETROIT, MICH.

## New Castle Folding Fabric Blackout Partition

A folding fabric blackout partition for building entrances has been developed by New Castle Products, New Castle Ind. Designed to conform to blackout standards and at the same time permit easy access to and exit from lighted buildings, the partition works on an accordion-like principle, assuring unusual flexibility. The partition derives its



New Castle Folding Fabric Blackout Partition

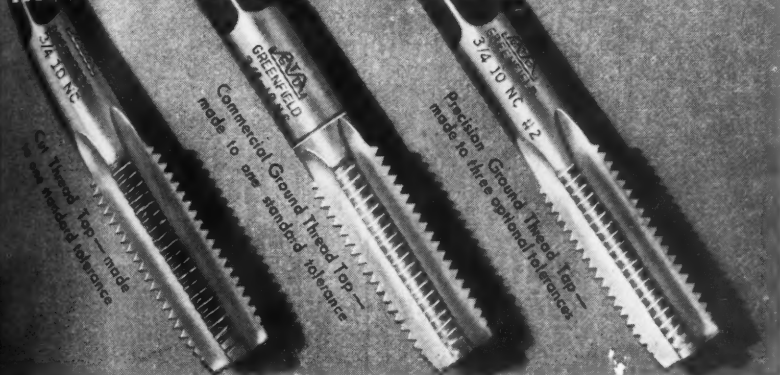
operation from a specially designed hinge lock self-spacing hinge plate at the top.

Folding on itself, the partition has a roller assembly traveling on an overhead track. A vertical pipe, concealed in a loosely fitted front hem is connected to the lead trolley and extends to approximately 6 inches from the floor. This pipe provides rigidity to the top of the partition and serves as a stay.

The flameproof blackout fabric is attached with grommets at the top and one side of the hinged plates. The height of the fabric is 2 inches greater than the height of the room, dragging the floor and assuring adequate coverage. Both sides of the hinge plates are covered with the same fabric. Valances are provided for each side to ensure perfect light lock.

The New Castle Folding Fabric Blackout Partition is attached to the wall with

# TAP TOLERANCES vs. CLASS of FIT



A common source of confusion in tapping is failure to distinguish between CLASS of FIT as applied to the PRODUCT, and PITCH DIAMETER LIMITS as applied to PRECISION GROUND THREAD TAPS. The cause of this confusion doubtless is the fact that both terms involve the use of a similar, but not identical, series of numbers, and that the corresponding numbers have no direct relationship.

CLASS of Work FITS or "Screw Thread Tolerances" are:

No. 1—"Loose" No. 2—"Free"  
No. 3—"Medium" No. 4—"Close"

Pitch Diameter LIMITS or TOLERANCES of Precision Ground Thread Taps are: No. 1, No. 2.

The table at the right indicates the taps which usually will produce Class 2 and 3 Fits, the ones most commonly used. Ordinarily, when using Precision Ground Thread Taps it is best to determine what screw assembly fit is required, then select the Tap to produce threads for that fit may be selected by trial from the optional tolerances available.

Size	Threads per Inch			Class		Size	Threads per Inch			Class	
	NC	NF	NS	2	3		NC	NF	NS	2	3
1/4	20	28	..	Cut	CG	0	80	..	..	PG 1	PG 1
3/8	18	..	..	Cut	CG	1	64	..	..	PG 1	PG 1
1/2	14	24	..	Cut	CG	2	56	..	56	PG 1	PG 1
3/4	12	20	..	Cut	CG	3	48	..	..	PG 1	PG 1
1	10	18	..	Cut	CG	4	40	..	..	PG 1	PG 1
1 1/4	8	16	..	Cut	CG	5	36	..	36	PG 1	PG 1
1 1/2	7	14	..	Cut	CG	6	32	..	..	PG 1	PG 1
1 3/4	6	12	..	Cut	CG	8	32	..	36	PG 1	PG 1
2	5	10	..	Cut	CG	10	24	..	32	PG 1	PG 1
2 1/4	4	8	..	Cut	CG	12	24	..	32	PG 1	PG 1
2 1/2	3	6	..	Cut	CG	14	..	28	..	PG 1	PG 1
2 3/4	2	4	..	Cut	CG	..	..	20	..	PG 1	PG 1
3	1	2	..	Cut	CG	..	..	16	..	PG 1	PG 1

## SYMBOLS

CUT—Cut thread taps, either in carbon or high speed steel.

CG—Commercial ground thread taps in high speed steel. See Standard Tables.  
PG—Precision ground thread taps.

## GREENFIELD TAP AND DIE CORPORATION GREENFIELD • MASSACHUSETTS

DETROIT PLANT: 2102 West Fort St.  
WAREHOUSES in New York, Chicago and Los Angeles

In Canada:  
GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.



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This is one of a series of advertisements published by the Greenfield Tap and Die Corporation to help users get greater production from their taps. The entire series is now available in booklet form. Send for a copy.



## Fumbling WASTES TIME COSTS MONEY

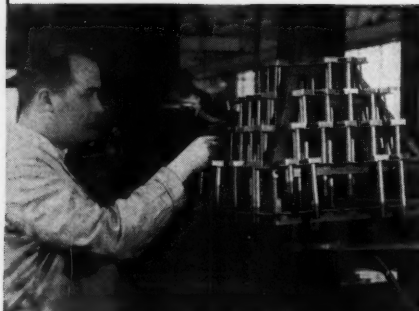
Boyar-Schultz Machine Bolt Rack saves time in keeping bolts clean and undamaged, and always ready for instant use.

It is sturdily built of heavy angle steel, bolted and spot welded throughout. It holds 104 machine bolts assembled with nuts and washers in lengths up to 16".

Made in 2 sizes for  $\frac{3}{8}$ " and for  $\frac{3}{4}$ " bolts. Larger size holds both  $\frac{3}{8}$ " and  $\frac{3}{4}$ " bolts.

Convenient because bolts can be quickly measured and selected without removing from rack.

**PRICE . . . \$18.50**



If you are tired of wasting time looking in odd places for the right size machine bolts,

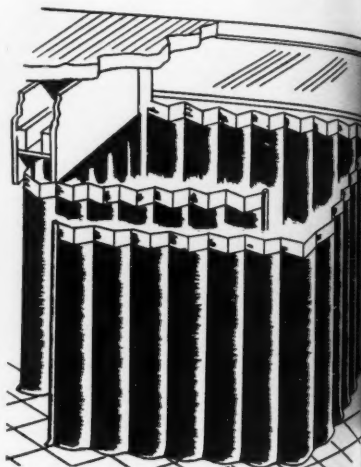
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Chicago, Ill.

screws or nails by means of a covered wooden cleat extending the full length of the partition. When not in use, the



View of Blackout Partition from Above, Showing Masking Arrangement

partition can be folded to the wall thereby consuming a minimum of space.

## P&H Armor Plate Welding Electrodes

Designated as P&H AW-1, AW-2, and AW-3, three electrodes designed specifically for the welding of armored vehicles according to Army Ordnance Department specifications AXS-492 and AXS-497 are now being manufactured by the Harnischfeger Corp., 4535 W. National Ave., Milwaukee, Wis. Details of the electrodes and their application pertaining to armor welding are restricted to prime and subcontractors qualifying under Ordnance regulations and are available only on application through Harnischfeger field representatives.

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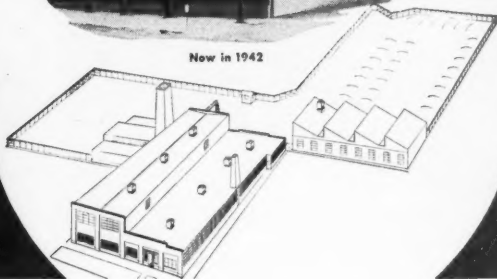
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During this time, our customers' (your) business has made it possible for us to serve certain needs of industry.

Maintaining this service has meant that in every few years, additional facilities have had to be incorporated and in more than a few instances, this has called for added floor space. That these additions have been necessary has shown to us that we have a right to be proud of the manner in which we have tried to cooperate.

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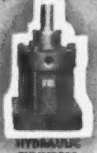
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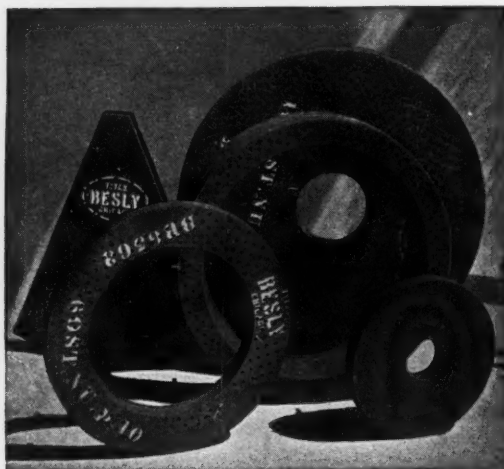


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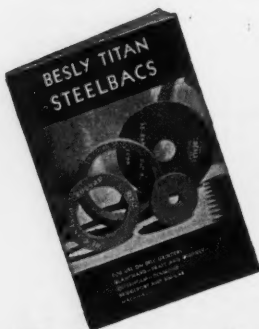
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The list of users of Besly Titan Steelbac Abrasive Discs reads like the roll call of the world's most progressive manufacturers. • Those who are truly wide awake realize the advantages of this Bolted-On Resinoid Bonded grinding member. • Safe—Economical—Free Cutting—Long Lived—Easy to Mount—Practically No Waste. In other words, the best thing of its kind ever developed. You don't have to accept

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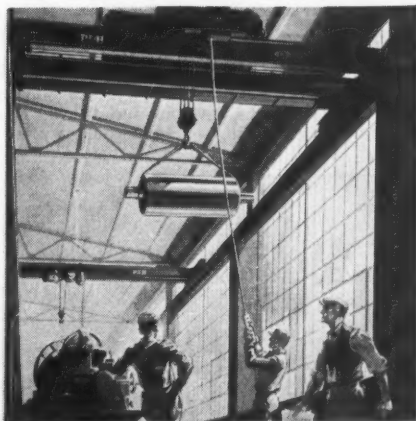
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Around production lines, assembly floors, warehouses, loading zones, and in countless other locations, P&H Trav-Lift Cranes provide swift, low-cost materials handling to speed the war effort. Designed for intermittent service, P&H Trav-Lifts are offered in a variety of sizes and types with capacities up to 15 tons. Write for bulletin H-13.



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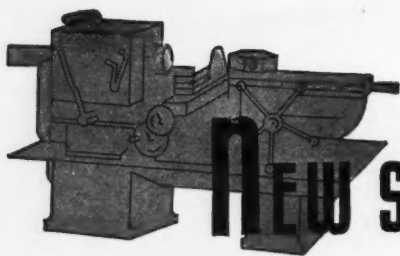
  
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# NEW SHOP EQUIPMENT

## Libby No. 4 Universal Ram Type Turret Lathe

A universal ram type turret lathe having a 2-inch diameter collet chuck capacity, 22-inch turning length, and 20-inch swing over ways is announced by the International Machine Tool Corp., Libby Division, Indianapolis, Ind. The machine, which is designated as the Libby No. 4, is supplied complete with tools for both bar and chucking work, and will accommodate 8, 10, and 12-inch diameter chucks. In addition, the machine may be equipped with special attachments which conform to specific applications or specific types of turret lathe work. These attachments include bar feed and collet chuck, taper attachment, and threading attachment.

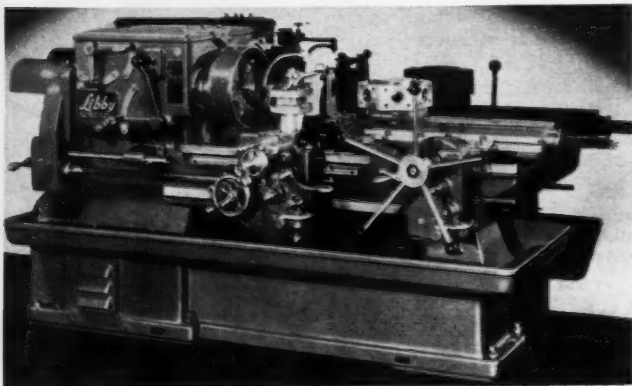
The one-piece bed and headstock is cast from nicked semi-steel. The machine is extra wide across the bed ways, measuring 12½ inches. The bed has internal cross ribs and longitudinal ribs which run the entire length to provide reinforcement for rigidly supporting the carriages and for taking accurate heavy cuts. Headstock walls ex-

tend well above the spindle, providing the spindle bearing with solid metal support.

Spindle control is provided by a single lever which operates a double multiple disc main drive clutch. In the forward position of this lever, the spindle rotates forward, and in the backward position, the spindle reverses direction of rotation. When the lever is in a neutral position, a sturdy multiple disc brake is applied automatically to stop the spindle quickly.

The all-gear headstock provides 12 spindle speeds which are controlled by three levers mounted on the front of the headstock. One lever divides the 12 spindle speeds into two groups of six high and six low. The second lever divides the speeds in these groups into two groups of three speeds each. The third lever has three positions and is used to select from these groups the particular speed desired. When the first lever is placed in center position, the spindle is free and can easily be turned by hand.

Individual motor drive is provided for the machine, power being transmitted by multiple V-belts. The motor—5 or 7½ h.p.—is mounted in the base of the machine on a hinged base, which provides a means for tightening the belts. All motor controls and wiring are built into the machine, and a conduit box is provided at the rear for connecting to a power line.



Libby No. 4 Universal Ram Type Turret Lathe

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May, 1942

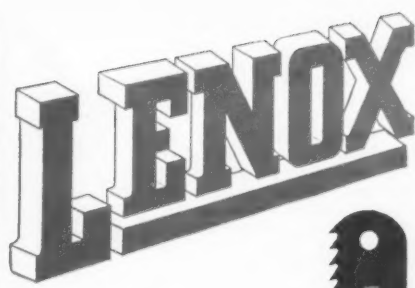
All gears in the headstock transmission are heat-treated alloy steel. The high speed drive gear to the spindle is of the helical herringbone type, which transmits a smooth, uniform flow of power to the spindle. The spindle is mounted on a double row preloaded precision selected straight roller bearing at the front and a single row straight roller bearing at the rear. All thrust on the spindle is taken at the rear by a large diameter, specially selected ball bearing.

The universal carriage is equipped with six reversible cross and longitudinal feeds which operate independent of the hexagon turret carriage. Feeds are engaged by individual levers that operate large diameter friction type clutches, which may be adjusted from the outside of the apron. Quick-acting levers disengage the feed by a slight touch of the hand or may be set for automatically disengaging the power feed at predetermined points. Feeding is accomplished by a pinion and rack mounted on the bed. Adjustable feed trip dogs are provided for the cross slide, and a six-screw stop roll is provided for the longitudinal travel of the carriage. Hand feeding to desired dimensions is facilitated by a large micrometer dial which is graduated in thousandths of an inch and provided with observation clips for ease in duplicating close dimensions.

The cross slide holds the quick-indexing square turret at the front and is provided with three cross T-slots at the rear for holding a rear tool post. The square turret tool post is operated by light pressure on a single handle, which is used to unclamp and reclamp the turret in a newly indexed position. The tool post may be locked in any one of 12 positions for performing a series of operations.

The hexagon turret ram slide carriage is provided with six power feeds to the ram slide in the forward direction. Feeds are engaged by a quick-acting lever on the turret apron. Automatic feed trip and dead stop are provided for each face of the turret by means of a six-screw stop roll. The screws are adjustable by a crank and may be individually set for a series of operations. The turret is automatically unclamped, indexed, and reclamped by means of the five-spoke pilot wheel which controls the forward and reverse movement of the ram slide.

When the ram slide is moved back, the turret is automatically unclamped and indexed to the next position. On the forward motion, the turret is auto-



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### Diehl No. 2 Turret Lathe

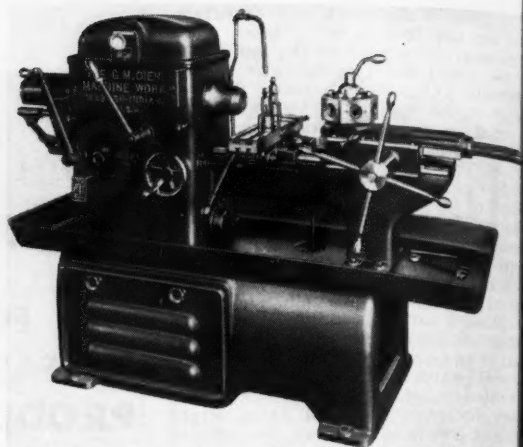
▼

matically located by a hardened and ground taper locating plug which fits into a hardened and ground steel bushing in the turret. Simultaneously, on the forward motion of the ram slide, the turret is automatically clamped in place by a double tapered locking ring that is operated by a powerful toggle lever arrangement.

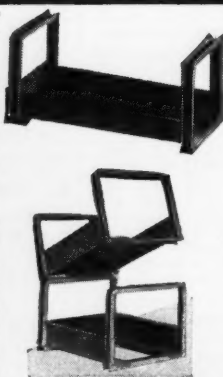
Lubrication is automatically applied to the machine in many places. Coolant is supplied from the main bed casting of the machine at a rate of  $2\frac{1}{2}$  gal. of coolant per minute.

### Diehl No. 2 Turret Lathe

Shown here is the Diehl No. 2 Turret Lathe which is now being manufac-



tured by the G. M. Diehl Machine Works, Wabash, Ind. The headstock spindle is mounted in Timken roller bearings, and the spindle nose is properly hardened and ground with thread and pilot. The drive shaft of the headstock is mounted on anti-friction bearings.



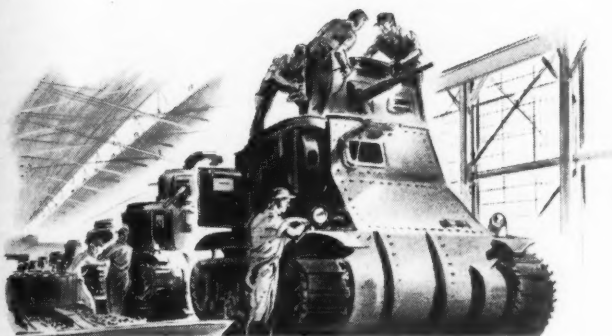
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Every box is "on top of the pile" when you use STACKRACKS. Heavy containers slide in and out like drawers—you can get at the contents of any one quickly and easily without disturbing the others. Patented STACKRACKS, to fit your boxes, interlock to form storage units of any size, shape or capacity.

Write today for full information and low prices. Stackbin Corp., 53 Troy St., Providence, R. I.

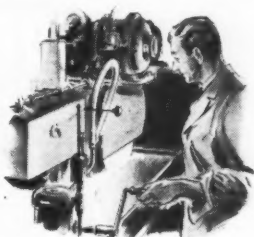
**STACKRACKS**  
"STACKED AND STILL ACCESSIBLE"

# The wheel that cuts tank armor like a sharp knife slices bread!



When steel men made tank armor that could withstand anti-tank fire, they put our army one up on the battlefield. But they posed a new problem in tank construction. Precision cutting of the armor plate is necessary at many places to insure contact for welding. But because of its toughness, ordinary mechanical cutting methods wouldn't do. What was the answer? With Carborundum Brand Cutting-Off Wheels, the 1-1/8" armor plate is now sliced like you'd slice a loaf of bread. And so accurately that mating parts fit perfectly.

These abrasive wheels have revolutionized cutting-off methods. Often of extreme thinness, they even perform such delicate operations as slotting the points of fountain pens! Today Carborundum-made Cutting-Off Wheels are used to cut plastics, glass, brick, tile, steel and non-ferrous metals in plate and bar stock ...faster, more safely, and more economically. In most cases further finishing is unnecessary.



This is not the only "short cut" in which Carborundum has pioneered. Our research, plant facilities, and sales engineering have helped manufacturers reduce costs and speed production in many ways. Perhaps they can do as much for you. The Carborundum Company, Niagara Falls, New York.

**CARBORUNDUM**  
THE CUTTING OFF WHEEL  
ABRASIVE PRODUCTS

Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company

ings and is connected with the motor by multiple V-belts and with the spindle by flat belt with automatic idler for constant tension. Speed controls are conveniently located within easy reach of the operator. The two-speed, constant horsepower motor and lever-operated three-step belt shifter provide six speeds in forward or reverse.

The bed of the machine is of well ribbed box construction and is cast integral with the headstock. The bed is made of close-grained nickel semi-steel, with ways carefully scraped and spotted. The integral-cast cabinet base provides adjustable mounting for the motor. The self-contained coolant tank with electric motor-driven pump is readily accessible and can be removed as a unit for cleaning.

The automatic collet chuck and bar feed are operated by a long lever located in front of the headstock. Forward movement of the lever opens the automatic chuck and feeds the bar stock; reverse movement closes the chuck. The stepped wedge, operating chuck closing fingers, automatically compensates for slightly varying diameters of work.

Longitudinal feed to the cross slide

carriage is by means of feed screw and nut, operated by graduated handwheel on the headstock. Cross-feed is operated by cut-off lever, rack and pinion with two stops.

The turret slide is operated by hand stile through rack and pinion. Turret indexing is automatic. The turret rotates on accurate seat and is locked by simple clamping device. Turret face and tool holes are designed to accommodate standard flanged or shank tool holders.

The sturdy turret lock bolt is made of special alloy steel, hardened, ground and lapped to perfect fit in hardened and ground tapered index bushing in turret. To maintain accuracy of turret indexing over a long period of time, the vertically moving lock bolt is located at the front end of the turret slide and near as possible under the working tool.

Specifications of the Diehl No. 2 Turret Lathe are as follows: automatic chuck capacity, 1-inch round work, 1-inch square work,  $\frac{1}{2}$ -inch hexagon work; swing over bed, 14 inches; swing over cross slide, 6 inches; width across bed ways, 7 inches; hole through spindle,  $1\frac{1}{4}$  inches; spindle nose,  $2\frac{1}{2}$  inches O.D.; cross slide and carriage—total cross travel, 5 inches, total longitudinal

**NEW**



PATENT PENDING

# Clayton

## BORING BAR HOLDER

★ INCREASES PRODUCTION

★ SAVES TIME AND MONEY

**NEW, perfected 2-way clamping arrangement** permits changing or the adjustment of the boring bar without disturbing alignment of boring bar holder with the lathe—or, identical boring bar setting may be maintained for subsequent operations when boring bar holder is removed from lathe.

Any size boring bar (within capacity of holder) is instantly centered and clamped into place. Exclusive V clamp assures rigid, proper alignment. Sliding dowel maintains constant alignment of center post and V slots in body. No "fingering" or bushings required!

All Clayton Boring Bars are permanently marked in quarter inch graduations to speed production. Eliminates necessity for file and chalk markings. Allen set screws hold square boring bits rigid at all times.

Clayton Boring Bar Holders are made in sizes for 9" to 36" lathes. Holders available in sets complete with boring bars. Individual bars may be purchased in any quantity.

*Pays for Itself ... Costs No More than Ordinary Equipment*

Write for complete descriptive literature and prices

**CLAYTON MANUFACTURING CO., ALHAMBRA, CALIF.**



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**Flexible**  
as Your Arm



*The New*  
**Dazor Floating Lamps**  
INCANDESCENT      FLUORESCENT

Think how easily you can swing your arm to any desired position. That's how swiftly, how effortlessly, a touch of your hand will float the Dazor Lamp wherever you want it. Push, pull, raise, lower or twist it—the light stays put. No screws to tighten!

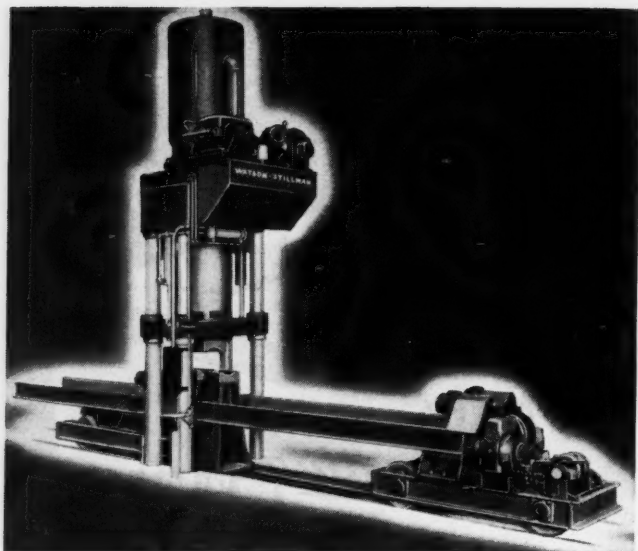
Three exclusive features explain the Dazor's popularity: (1) Enclosed Patented Spring Balance, which automatically holds the light firm; (2) Maximum Adjustment, a 6-ft. spherical field; (3) Combined Manual Switch and Starter.



UNIVERSAL MODEL

Fasten the Dazor Floating Lamp to your machine, bench, drawing board—anywhere. All models either Incandescent or Fluorescent. Call the Dazor-appointed electrical wholesaler near you. Or write for literature and distributor's name. Do it today, for comfort . . . economy . . . greater and safer production.

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4483 DUNCAN AVE.      ST. LOUIS, MO.



**Watson-Stillman 1000-Ton Straightening Press**

travel, 12 inches; motor, 3 h.p., 900/1800 r.p.m., 60 cycle or 750/1500 r.p.m., 50 cycle; speeds, 180, 300, 365, 500, 620, and 1,000 r.p.m.; diameter of turret across flats,  $7\frac{1}{2}$  inches; tool holes, 1 inch diameter; tapped holes in turret face, 2; maximum distance spindle end to turret face, 20 inches; maximum turning length, 6 inches; net weight, 2,700 lbs.; shipping weight, 2,950 pounds.

### **Watson-Stillman 1000-Ton Straightening Press**

A giant 1000-ton straightening press standing 21 feet high has been completed by The Watson-Stillman Co., Ro-

selle, N. J. The press is used to straighten shafts from 12 to 60 inches in diameter and 7 to 60 feet long, and is designed for operation by a single person from a central control panel.

For handling and positioning work, two sets of rollers are provided, one set being mounted on a hydraulic lifting ram which, in turn, is mounted on a motor-driven carriage running on rails between the columns of the press. One set of rollers is motor-driven and rotate the work as required. When the work is positioned, the lifting ram under the rollers lowers the work onto two bending blocks, each of which is independently motor driven for separation adjustment from 2 feet 3 inches to 18 feet.

The Watson-Stillman 1000-Ton Straightening Press has an advancing speed of 470 inches per minute, pressing speed of  $15\frac{1}{2}$  inches per minute and return speed of 470 inches per minute. The stroke is 38 inches, press opening 48 inches, and space between columns 48 inches. The press pump is a rotary piston oil type and is driven by a 50 h.p. motor. The press proper occupies a floor space of 8 x 24 feet and

## **ACROMARK means "ACCURATE MARKING"**

and the ACROMARKER is only one of the FAST but simple machines our engineers build for marking.

This machine is provided in several sizes and special fixtures are made for special work.

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**THE ACROMARK CORPORATION**

9 MORRELL ST., ELIZABETH, N. J.



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# Gages

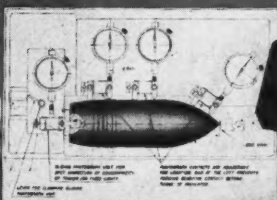
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SEE if it's right at once. Later, is too late. These gages have proven their ability to show you what is right or wrong at once — and positively.

There's hardly a dimension you must finish your work to, but what you can inspect with greater speed and surety with Federal Dial Indicator Gages.

The snap gages don't wait for you to "feel" — they show you at once. The pitch diameter gage is good for British threads as well as U. S., and it is accurate to .0002". It is decidedly new and decidedly suited for precision threads. The shell gages are faster and decided improvements over other models. New designs are available for thousands of your material inspection jobs. Tell us what you need.

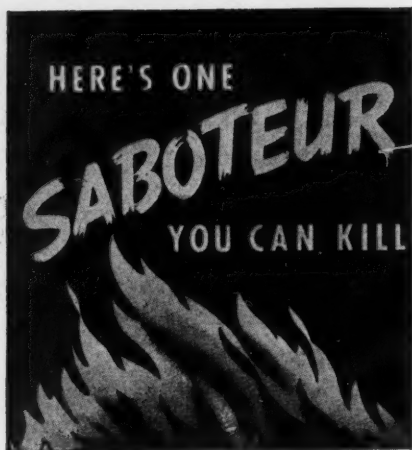
FEDERAL PRODUCTS CORPORATION  
1144 Eddy Street Providence, R. I.



# FEDERAL

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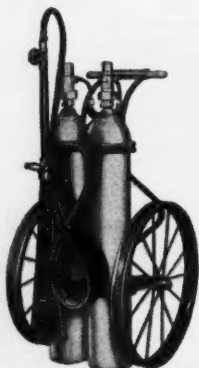
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C-O-TWO Wheeled Type Discharge hose and horn; steel wheels, plain or rubber tired, for in or out-door protection.

C-O-TWO\* is a registered trademark. To be safe, specify "C-O-TWO" and this company's name when ordering.

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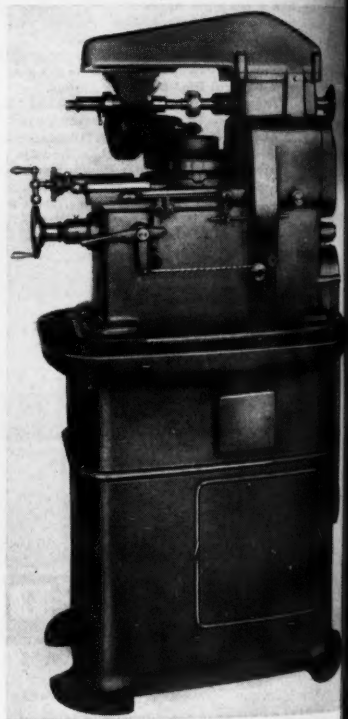
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Sales and Service in **C-O-TWO** the Principal Cities of United States and Canada

is 28 feet high overall (21 feet above the floor).

**Model No. 1 American Micon Spur and Spiral Gear Hobbing Machine**

The illustration shows the Model No. 1 American Micon Spur and Spiral Gear Hobbing Machine which is being distributed by the Triplex Machine Tool Co., 125 Barclay St., New York, N. Y. The machine is designed to generate accurate spur and spiral pinions and gears, right or left-hand up to 6 inches in diameter and maximum diametral pitch 12, such as used in small precision machines, instruments, meters of all kinds, clocks, and mechanisms requiring similar gear accuracy. The high accuracy required



Model No. 1 American Micon Spur and Spiral Gear Hobbing Machine

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## GAUGES *Gauging* GAGES

We are making gages—checking gages—out here at VARD. At present we are in full production on threaded plug gages, plain tapered pipe ring gages, or step gages, and roll thread snap gages.

In addition, we make precision ground special taps on order.

To manufacture production gages of exact precision we have the necessary constant temperature rooms, super-micrometers, comparator, shown above, and optical checking equipment. In fact, we make optical flats, accurate to .000001 of an inch. Which is really exact.

But more than machines, VARD has assembled a group of gage makers who know their jobs thoroughly. Minds too are exact here at VARD.

Finally, in our large shops, turning out aircraft parts, navigation plotters and instruments for the war, we have opportunity to check our gages in actual use.

VARD gages will rank with the world's best.

**VARD INC.** PASADENA, CALIFORNIA  
SUCCESSOR TO VARD MECHANICAL LABORATORY

this class of work results in part from the application of the hobbing method of generating the tooth profile.

Gear blanks are firmly held on a work arbor, one end of which fits into a tapered hole in the work spindle nose. The other end is supported by a center in the tailstock (outboard support), which is adjustable on the overarm. For chucking pinions with integral shafts, spring collets with holes up to  $\frac{1}{2}$  inch diameter can be furnished for mounting in the tapered hole in the work spindle.

The hob spindle is mounted in the headstock, which has a swivel base that can be set to the proper helix angle for hobbing spiral gears. The entire hob spindle assembly is mounted on the carriage, which has automatic longitudinal feed. The length of the automatic traverse of the carriage is 5 inches. The power feed is actuated by a lead screw in the base, the lead screw being driven by the work rotating spindle through four feed change gears. Nine feeds ranging from 0.002 to 0.033 inch per revolution of the work are available through the use of the standard set of feed change gears furnished with the machine.

The hob spindle is driven by the main

drive shaft through a pair of helio gears, a pair of bevel gears, and two spur change gears. A set of four speed change gears is furnished with the machine, which, in connection with the two steps on the main drive pulley, make available four different speeds between 280 and 950 revolutions per minute.

The hob is brought into cutting position by elevating the swivel base of the headstock. This is done by turning a handwheel on the front of the machine. The correct position is then maintained by clamping. The sleeve on the hand wheel is graduated in thousandths.

After setting the hob to the correct cutting depth, the automatic feed is engaged by tightening the feed friction clutch near the front handwheel on the lead screw. Upon completion of the work, an adjustable stop stops the motor, the operator removes the work piece, releases the feed clutch, brings the carriage back into starting position and reloads the machine.

The rotation of the work spindle is provided by a train of gears from the main drive shaft over index change gears in the rear of the machine and through a differential on the left-hand side of the machine. The standard

## SHEAR-CUT

HIGH SPEED

## END MILLS



Here's a complete line of  
Single and Double End Mills.

They save time and money.  
Specify Progressive Shear-Cut End Mills.

Write for catalog and prices.

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**CUT OFF**  
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including four pages  
on cut-off wheels  
with sixty-nine proven  
specifications.

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ABRASIVE PRODUCTS CO., WESTBORO, MASS.



## VITAL AS BULLETS

Machine tools and their accessories such as Drill Bushings are as vital today as the war equipment they produce. To help guard against delays, a large stock of Universal Drill Bushings in standard sizes are on hand, ready for quick delivery. Universal's with superfinished bores offer more for your bushing dollar. Write for prices and data sheets.



**UNIVERSAL**  
Engineering Company  
Frankenmuth, Mich.

equipment of the machine includes a set of three change gears for one definite number of teeth on the workpiece. Change gears for other numbers of teeth can be furnished on order. Any number of teeth between 6 and 120 can be hobbled on the machine, also any even number of teeth between 120 and 260. Between 260 and 325 the number of teeth must be divisible by 5.

The differential mechanism mentioned above is used only when hobbing spiral teeth. When hobbing spur gears the differential is locked out of action but when hobbing spiral teeth, it transmits an additional rotation to the work spindle. Each helix angle on the work requires a set of four helix change gears; only one set is furnished standard with the machine, additional sets being extra. The combined action of the index change gear mechanism and the differential mechanism is transmitted to a worm which engages a large diameter worm wheel on the work spindle.

A 1 h.p. motor, mounted inside the pedestal, drives the machine through a two-step belt drive. Provision is made for maintaining constant belt tension. A compact motor pump unit provides an ample flow of coolant from a tank in the base.

The main castings of the machine are of Meehanite and the spindles are hardened tool steel or S.A.E. 3140 steel.

## Murchey No. 42 Thread Milling Machine

Intended for the mass production of right or left-hand internal or external threads from 4 to 12 inches in diameter by means of annular milling cutters covering the full length of thread, the thread milling machine designated as the No. 42 has been brought out by the Murchey Machine & Tool Co., Detroit, Michigan.

The machine is of rugged construction with heavy bed section and sliding table mounted on large ways. The table forms a support for the chucking fixture and is provided with two T-grooves and a keyway, the keyway being used for locking purposes only and the T-grooves for bolting the fixture to the table.

The bed is a semi-steel casting of heavy box-type construction, providing an enclosure for motors, starters, a drive pulley unit, hydraulic unit, and lubricating and cooling systems.

The longitudinal travel of the

## INCREASE PRODUCTION REDUCE COSTS—

Convert your present machines  
for efficient war production  
with the new

### BRADY-PENROD Replacement Coolant Pump MODEL 600

The advantages of this open-impeller centrifugal coolant pump are apparent at first glance. Here is a pump that stands up under hard usage twenty-four hours a day, seven days a week, without replacements. Model 600 is not a makeshift pump but the newest addition to a quality line—identical in general construction to the other five BRADY-PENROD models used as standard equipment by machine tool manufacturers.

#### Motor Size Is Important!

Through superior design, the  $\frac{1}{8}$  H.P. NEMA motor moves as much liquid as formerly handled by a  $\frac{1}{4}$  H.P. motor, at negligible current cost. Motors are available for all current specifications.

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BRADY-PENROD, INC., Muncie, Indiana, U. S. A.

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ON A MILLING MACHINE



**Hydraulic Efficiency  
As High As 70%!**

#### FOR:

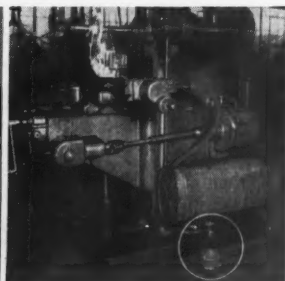
Lathes — Tappers  
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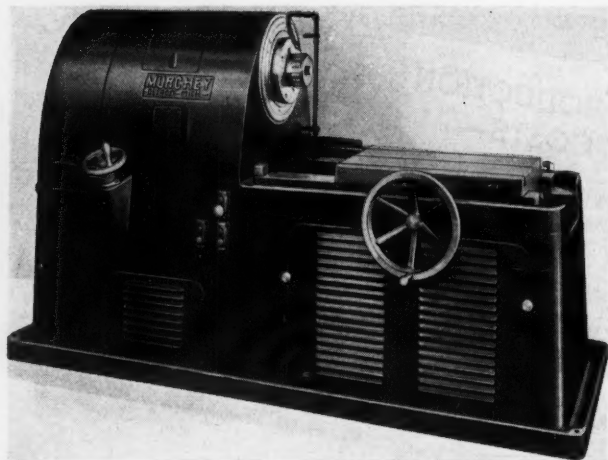
#### CONTROLLED FLOW

Pump will deliver water or light oil at the approximate rate of 60 gallons per hour with  $\frac{3}{8}$ " tubing to 1,200 gallons per hour with 1" pipe.

#### EASILY INSTALLED

Any shop man can install the Model 600 easily and quickly at little cost.





Murchey No. 42  
Milling Machine

riage is controlled by a conveniently located handwheel, the travel being limited by an adjustable stop. All controls are located at the front of the machine near the headstock where they are readily accessible to the operator.

In operation, the milling hob of the

machine is revolved eccentrically about the work in which the thread is to be cut and simultaneously rotated on its own axis until the cutting teeth of the hob are advanced into the work a sufficient distance to produce the full depth of thread. The cutter then continues rotating on its own axis, revolving about the work and is simultaneously advanced by means of a hand

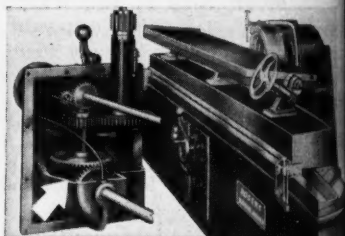
## Pullmore Clutches

### In Armor-Plate Grinders

In Rogers Armor-Plate Sizing Machines, an automatically operated Double Pullmore Clutch reverses the table every 20 seconds, at each end of stroke. Inside view of table-control unit shows sturdy, accessible design. Arrow indicates compact Pullmore Clutch installation, between reversing gears, in oil bath. Equally effective Pullmore applications are made in Rogers Machine-Knife Grinders and other products.

Pullmore Clutches have a long record of successful operation in machine tools, wood-working machines, hoists, packaging and other automatic or semi-automatic machinery. Listed in single or double types, for operation in oil or dry, in standard sizes up to 75 h.p. at 500 r.p.m.; Pullmore Clutches meet today's multiple-disc clutch requirements. Investigate. Ask also about Rockford Plate Clutches.

Pullmores are sold by MORSE CHAIN CO. offices in principal cities.  
**Rockford Drilling Machine Division**  
300 Catherine Street, Rockford, Illinois, U. S. A.



At right: Rogers Armor-Plate Sizing Machine. Above: table drive unit. Double Pullmore Clutch. Arrow on Unit indicates Pullmore location.



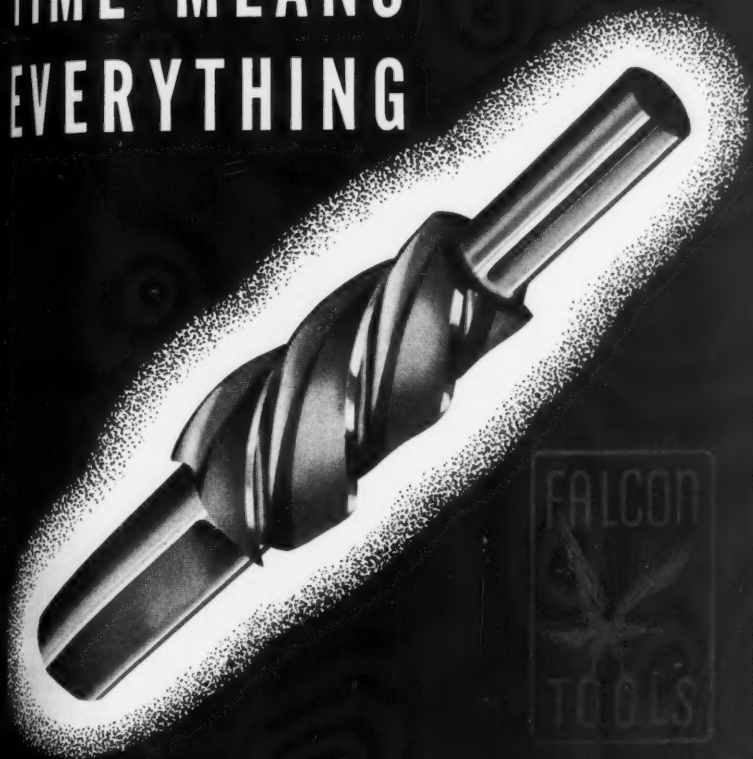
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# TIME MEANS EVERYTHING



When a cutting tool lasts  
for five thousand operations  
it is five times as economical  
as one that has to be re-  
ground and reset for every

one thousand operations.  
Saving of time and labor  
make for utmost efficiency,  
thus helping to win the war  
more quickly.

## FALCON TOOL CO.

DETROIT, MICHIGAN

WIRE FOR DETAILS AND DELIVERY DATA—  
WE'LL GIVE YOU QUICK ACTION!



## RUSH REPAIR JOBS

### --- A WAY TO AVOID THEM

The loss you would suffer in output by being forced to shut down a Productive Machine for repairs would probably be greater today than at any time in your history—why not guard against such shutdowns by using KANTI-LEVER COUPLINGS? They have a Cushion Torque that protects your Productive Machines, your Gears, Motors, Speed Reducers, Bearings, etc., by absorbing the constant vibration and sudden load shock that cause gradual deterioration and finally shutdowns and rush repairs. They likewise protect you against the evils of shaft misalignment the same as does the ordinary Flexible Coupling. The cut below shows 70 KANTI-LEVERS that have run for 18 years and during that time have paid back their first cost many times over by reduction of repair bills and prevention of shutdowns.

Send for Bulletin 28-M describing

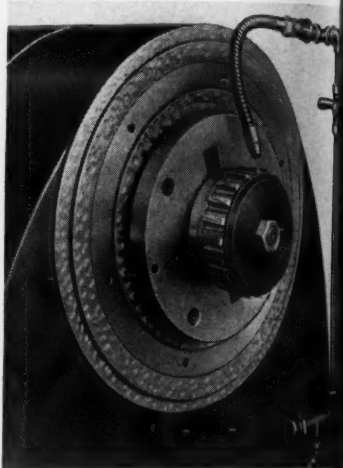
## KANTI-LEVER COUPLINGS



**BROWN**  
ENGINEERING CO. 120 N. THIRD ST.  
READING, PA.

relation of thread assured.

By means of the hardened and ground lead screw, which is mounted directly on the eccentric spindle bushing, the machine operates in segmental lead nuts, extreme accuracy in the pitch of thread can be transmitted directly to the milling hob. The depth of thread is directly controlled by adjustment of the eccentricity of the cutter spindle. To change pitch or to change from right to left-hand threads, the lead screw, segmental lead nuts, and



Headstock of Murchey Thread Milling Machine with Milling Hob in Position

ing hob or milling head must be changed.

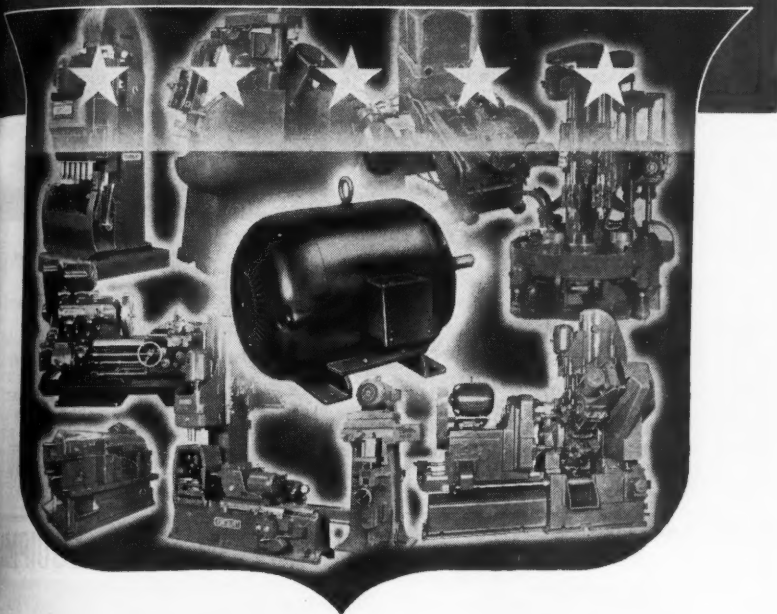
The cutter spindle is a hardened and ground steel forging mounted in tapered preloaded roller bearings. The outer eccentric spindle sleeve runs on adjustable taper bearings made of special phosphor bronze, and is driven by a worm or worm gear.

The Murchey No. 42 Thread Milling Machine is equipped with a hydraulic unit which actuates the feed of the cutter and the cutting cycle. Feed control valves are furnished which provide complete adjustment for feeding the milling hob or head into the cut as well as for governing the cutting cycle.

Adjustment of the machine for proper thread diameter and thread depth is made by set screws on the eccentric spindle sleeve. After adjusting the machine for proper thread diameter and



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## WAGNER MOTORS On Your Machine Tools

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Bulletin MU-102 on Wagner Polyphase Motors contains complete technical data and information that every user of machine tools should have. Write for your FREE copy today.

The high efficiency and dependability of Wagner totally-enclosed fan-cooled motors make them the choice of users of all types of machine tools. They reduce maintenance costs by giving longer service under the most severe operating conditions.

Here are a few of the reasons why Wagner CP motors are ideal for all types of machine tools —

1. **TWO FRAMES** — The inner frame prevents the entrance of metal dust, chips or cutting oils. The outer frame guides a strong cooling draft over the motor.

2. **EXACT ELECTRICAL CHARACTERISTICS** — Built in several distinct electrical types with varying torque and current characteristics required by the various types of machine tools.

3. **PRECISION CONSTRUCTION** — Dynamically balanced rotor, and all mechanical parts accurately machined to close tolerances to assure smooth operation.

Cut your motor maintenance and keep production schedules on time by specifying Wagner CP motors.

M40-2

### Wagner Electric Corporation

6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

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MODERN MACHINE SHOP

227

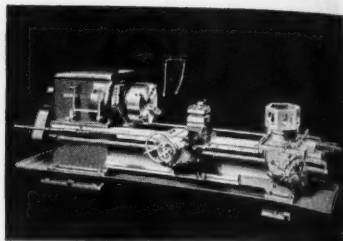
thread depth, the complete working cycle is automatic. The machine, however, may be stopped at any point during the cutting cycle.

Specifications of the Murchey No. 42 Thread Milling Machine are as follows: capacity, threads from 4 to 12 inches in diameter; top of table to center of spindle, 13½ inches; eccentric motion of spindle, 0 to ¾ inch; r.p.m. of cutter spindle, 33 to 645 r.p.m.; spindle motor, 5 to 7½ h.p., 1,800 r.p.m.; spindle adaptor, 10¼-inch flanged type with two driving keys and 50 milling machine taper; maximum revolutions of spindle during cycle, 1.2; feed motor, 2 h.p., 1,200 r.p.m.; table size, 21 inches wide x 30 inches long; floor space required, 37½ x 100 x 57 inches; net weight, approximately 9,000 pounds.

### Gisholt 3R and 4R Saddle Type Turret Lathes

Two saddle type turret lathes designated as the 3R and 4R are now being produced by the Gisholt Machine Co., 1219 E. Washington Ave., Madison, Wis. Calculated to meet the urgent wartime requirements for this type of machine

tool, the 3R and 4R turret lathes are equivalent in most physical specifications to the Gisholt 3L and 4L machines, each lathe being provided with



Gisholt Saddle Type Turret Lathe

the most commonly used tools and attachments.

General specifications of the lathes are as follows: 3R—5¼-inch spindle bore, 21-inch chuck, 28½-inch swing over ways, 26-inch swing over carriage wing, 21½-inch swing over cross slide; 4R—9¼-inch spindle bore, 24-inch chuck, 31-inch swing over ways, 27½-inch swing over carriage wing, 24½-inch swing over cross slide.



### "ALL-IN-ONE" EQUIPMENT

for Grinding and Lapping Carbide Tipped Tools, Alloy and H.S.S. Tools

**BENCH TYPE  
PEDESTAL TYPE**

Equipment as shown includes diamond lap, 60 grit wheel and 110 volt, 60 cycle, A.C. motor. DELIVERY FROM STOCK.

Pre-loaded ball bearings 6" x 1½" wheels, 1750 r.p.m. Accessory equipment for grinding chip control grooves, for cutting carbide tips and for sharpening twist drills.

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**T. C. M. MFG. CO.**

Since 1910

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the lathe  
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May, 1942



# GEARS for DEFENSE

Let's get down to earth. Here are the facts:

**TO SPEED PRODUCTION**

**TO GET EQUIPMENT FASTER and CHEAPER**

**TO REDUCE COSTS**

**AND .....**

Gear Shaving saves 4 months out of every 5 required to finish gears by grinding.

Gear Shaving saves 5 dollars out of every 6 required for equipment to finish gears by grinding. Low equipment cost—low delivery.

Gear Shaving saves 7 dollars out of every 8 in tool cost per gear on equal path grinding.

Gears produced by shaving are MORE ACCURATE—readily proven by their greater quietness—than those produced by grinding on a production basis. (Excepting of course ground gears laboriously produced on a "tool room" basis impossible where production quantities are needed.)

Our engineers are ready and anxious to help you speed defense gear production. Their experience in lowering gear costs, speeding gear production, improving gear accuracy and reducing gear failure for producers of automobiles, machine tools, tractors, electrical equipment, trucks, etc. is yours for the asking.

\*Gears of various sizes and materials ground on production lathes show greater savings.

**MICHIGAN TOOL COMPANY**  
1171 E. McNICHOLS ROAD DETROIT

*Let's eliminate the bottleneck, to take—not next year*

Since the advertisement at left appeared in 1940, there has been widespread adoption of the "Michigan" cross-axis shaving process for finishing aircraft gears to multiply output and cut costs — while IMPROVING QUALITY.

**Saves 4/5 of  
the time  
Saves 5/6 of  
equipment cost  
Saves 7/8 of  
the tool cost**

Most, but not all aircraft gear designs lend themselves to finishing by shaving. We will be glad to advise you whether or not your gear designs permit the use of the "Michigan" gear finishing process. There are several types of finishers to choose from — rotary and rack — external and internal — for large gears and small gears.

**... so AERO GEARS, too  
are now SHAVED . . .**

A Battery of "Michigan" rotaries finishing gears in the plant of one aero engine producer. →



**MICHIGAN TOOL  
COMPANY**

1171 E. McNICHOLS ROAD  
DETROIT, U. S. A.



## Gather Your Rightful Profits

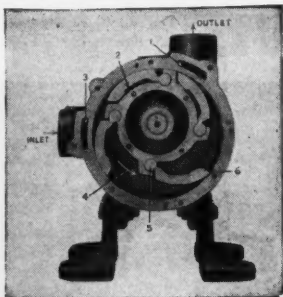
By Using the World's  
Champion in

**LEIMAN BROS. PATENTED**

## VACUUM PUMPS

Also Used as Pressure Blowers,  
Gas Boosters, and Air Motors.

**They Take Up Their Own Wear**

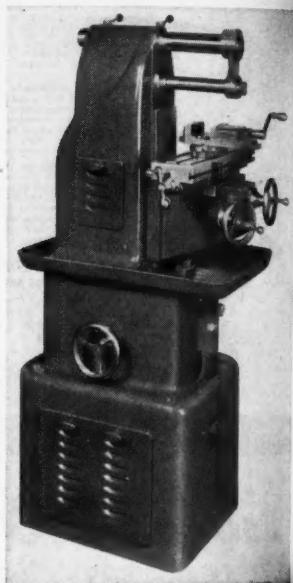


**LEIMAN BROS. INC.**  
103-3 Christie St.  
Newark, N. J.

## Vernon Improved No. 0 Mill

Machinery Mfg. Co., 1915 E. 51st St. Vernon, Los Angeles, Cal., announces improvements in the design, construction, and operation of its Vernon No. 0 Mill. Improvements in bearing assemblies include labyrinth housings for the spindle bearings, replacing the oil seals formerly used. Double rows of bearings on cross and longitudinal lead screws replace the single row in former models.

The power transmission has been im-



Vernon Improved No. 0 Mill

proved with accurately balanced spindle drive pulleys of increased size. Power feed pulleys have been enlarged from "0" to "A," and "B" section belts are used from motor to vari-drive and from vari-drive to countershaft. Keyways in both driver and driven pulleys replace set screws, and a more substantial power feed bracket is now equipped with two bronze bushings.

Other features of the Vernon Improved No. 0 Mill include heavier knurled tapered gibs throughout (column, saddle, and knee); 2½-inch additional column height; lead screws of 1½ inch diameter equipped with Zerk fittings; nuts; handwheels in place of lead screws.

here's  
proof!

# GIVEN

## VARI-SPEED DRIVE

### INCREASES PRODUCTION FROM OLD TOOLS

If your production problem involves getting more work out of older machine tools—and doing it quickly and economically—investigate the GIVEN VARI-SPEED DRIVE.

*On a turret lathe used in the shop of a large manufacturer, a Given increased average production 50% and, using a skilled operator, nearly doubled original output! Subsequent installations made similar production gains in this same plant, and others are doing it in shops all over the world.*

With the GIVEN you can . . . Increase spindle RPM 30% while maintaining low speeds . . . getting maximum production from carbide-tipped cutters. ● Obtain fast, stepless control of spindle speeds from fastest to slowest with just six turns of the handwheel. ● Eliminate lost time used in shifting belts. ● Maintain constant surface feet per minute regardless of depth of cut. ● Obtain additional RPM for high speed operations on small work diameters.

Available in a variety of mounting brackets for any machine tool, and in sizes from one to ten horsepower. Write for bulletin and blue-prints showing methods of installation. No obligation.

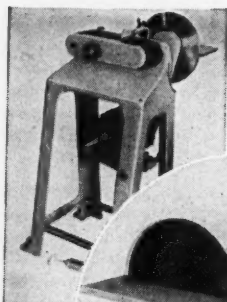
**GIVEN MACHINERY COMPANY**  
3855 Santa Fe Avenue • Los Angeles, California

Given  
VARI-SPEED  
Drive

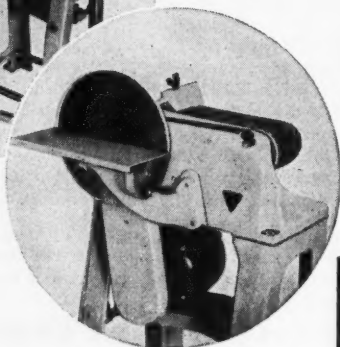
cranks; 4-inch longer overarm having sturdier bracket with honed bore; bronze gib lock handles; new type pedestal; larger chip pan, and new motor platform with adjusting quadrant to accommodate 1 h.p. motor.

## Keller Hy-Duty Power Hack Saw

Designated as the Keller Hy-Duty, a power hack sawing machine with cabinet base, built-in coolant tank, and pump in base is announced by the Sales Service & Mfg. Co., 473 N. Cleveland



*New!*



## DUPLEX "M" Combination Band and Disc Grinder

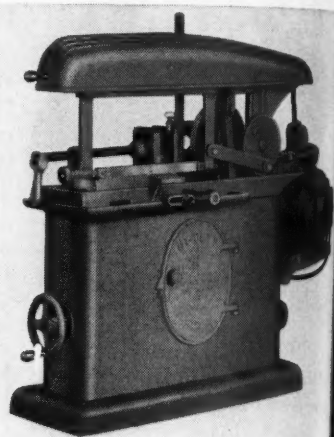
Improved and streamlined—heavily built for increased production and lower finishing costs.

Motor Driven Ballbearing throughout—Fully enclosed adjustable drive. Large disc grinding table.

Write for illustrated folder for this and other size grinders.

**WALLS SALES CORP.**  
96 WARREN ST. • NEW YORK, N. Y.

Ave., St. Paul, Minn. A special built-in feed control is provided to regulate feed pressure to the blade for light and heavy work. The pressure is regulated through a handwheel on the front of the base by merely turning the handwheel right or left to the pressure desired. Pressure is applied to the blade only when the blade is cutting. To protect



Keller Hy-Duty Power Hack Saw

the life of the blade, the blade is automatically raised on the reverse stroke.

The Keller Hy-Duty Power Hack Saw is provided with two cutting speeds. The machine is furnished complete with swivel base vise and has a capacity for sawing 6 $\frac{1}{2}$  x 6 $\frac{1}{4}$ -inch work straight and 4 x 4-inch work at a 45-deg. angle. The saw is powered by a  $\frac{1}{2}$  h.p. motor and equipped with an automatic stop switch for stopping the motor when the cut is completed.

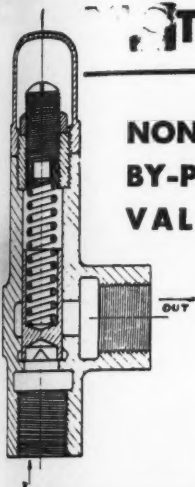
Get The  
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# YOU CAN'T AFFORD TO EXPERIMENT TO BE SURE USE . . .



## NON-CHATTERING BY-PASS, OIL RELIEF VALVES



## PRODUCTS

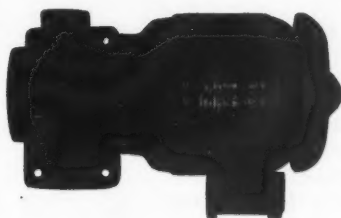
For oil pumping units where specific pressures must be constant. In pipe sizes  $\frac{1}{4}$ " to 2" for pressures from 0 to 350 lbs., with change of only five springs for pressure variation.

## CENTRIFUGAL COOLANT PUMPS

### Vertical or Horizontal

Select the type just right for your purposes . . . a host of models permits definite application on your jobs.

Exact position of discharge is positive.



Symbol FHM  
Horizontal Type

Get new bulletins



**Specialties Co., Inc.**  
BLANCHESTER, OHIO



# "TRUMORE" DIAMONDS

*Truly Economical for  
Truing Grinding Wheels*

Sectional view of  
long, natural dia-  
mond.

Never wears dull.  
Requires no reset-  
ting.

Furnished in any  
type of mounting  
desired.

(Norton Hex. shown)

Diamond held se-  
curely in special  
nickel alloy.

Write for Circular. Price  
for complete tool: 1/2 carat  
\$3.50, 1/4 carat \$7.50, 1  
carat \$22.00. All sizes up  
to 5 carats in stock. Immediate shipment.

**F. F. GILMORE & CO.**

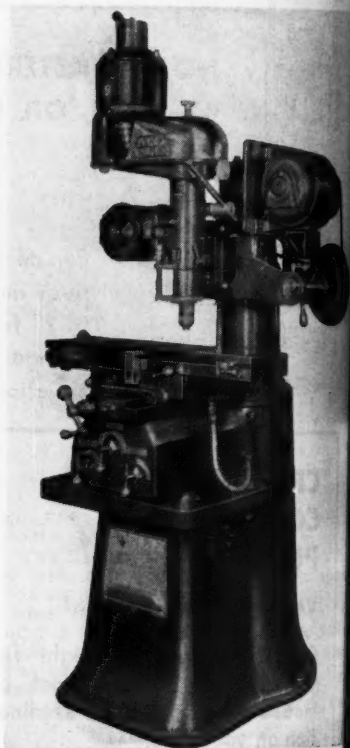
112 DARTMOUTH ST. • BOSTON, MASS.

**Diamond  
Importers and Toolmakers**



## Armor Universal Turret Milling Machine

A universal turret milling machine with hydraulic feed, to be known as the Armor, has been brought out by the Aircraft Machinery Corp., Burbank, Calif. The machine utilizes the combination of a horizontal spindle and



Armor Universal Turret Milling Machine

vertical spindle mounted in a rigid turret which can be rotated a 360 deg., thus enabling the machine to be used for numerous types of milling operations in toolrooms, pattern shops, experimental laboratories, and general production plants.

For production milling, the hydraulic feed for longitudinal table travel is used to provide smooth power for deep cuts. Hydraulic valves provide metered feed and rapid traverse in either direction.

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May, 1942

# Speed Your War CHANGE-OVER



## By Selecting VAN DORN Tools

Take a tip from the Weber Showcase and Fixture Co., Inc., Los Angeles, Calif. They found Van Dorn Tools were "just the thing" when they suddenly changed over to manufacturing ship ventilators on priority orders. They could not use their machinery—were forced to "take the tools to the job." Van Dorn Portable Electric Tools were chosen because of their greater efficiency, lower mainten-

ance cost, add the fact that one of Van Dorn's 26 factory-owned service branches was in a position to provide quick service. When changing over *your* plant, you too will find just the tools you need to speed production among the more than 100 in the Van Dorn Line. For complete information, write: The Van Dorn Electric Tool Co., 720 Joppa Road, Towson, Maryland.

**"Van Dorn"**  
(DIV. OF BLACK & DECKER MFG. CO.)

**PORTABLE ELECTRIC TOOLS**

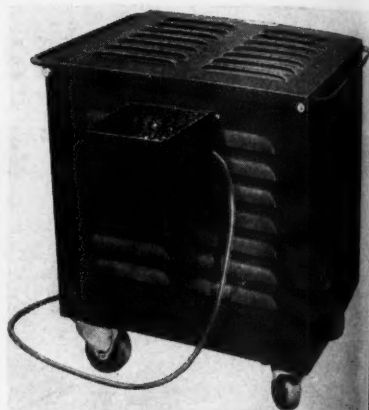
MODERN MACHINE SHOP 235

Micrometer stops guard against over-run, and hydraulic relief protects cutters against breakage or undue strain, thereby making the Armor particularly adaptable for operation by inexperienced operators.

For toolroom and experimental milling, two simple levers rapidly and easily convert longitudinal table travel from hydraulic feed to hand feed without disturbing work. The return to hydraulic feed is said to be equally simple. Additional features of the Armor Universal Turret Milling Machine include three low and three high speeds for each spindle, 16 inches of travel both vertically and longitudinally, 8½-inch cross travel, and so on.

### Allis-Chalmers "Crater-Eliminator"

Designed to assure a uniform, neat finish to the end of an arc welding bead without decreasing strength or ductility, the Allis-Chalmers "Crater-Eliminator" illustrated herewith has been introduced by the Allis-Chalmers Mfg. Co., Milwaukee, Wis. Although especially adapted for use with the Allis-



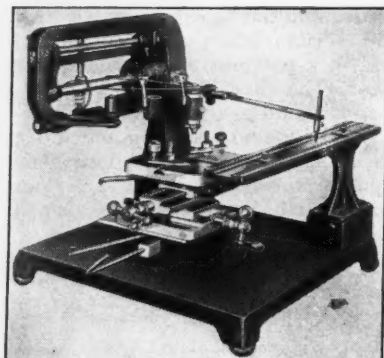
Allis-Chalmers "Crater-Eliminator"

Chalmers Weld-O-Tron Arc Welder, the "Crater-Eliminator" is, however, a separate unit consisting of current adjusting rheostat and motor.

To eliminate the rough crater-like pit that frequently forms when the arc is broken, the current, by means of the

## Pantograph **ENGRAVER** for

### Lettering and Numbering



Unskilled labor can produce uniform engraving on brass, aluminum, soft steel, and plastic materials.

Ideal for production work on panels, bar indicator plates, etc.

Adjustable ratio of pantograph is 1:5 and 1:2.5.

Standard machine is equipped with universal vise which handles all types of indexing, layout, and spacing work.

Write for illustrated catalog, Type A

**NEW HERMES INC.** 821 BROADWAY  
NEW YORK, N. Y.

# STEP UP PRODUCTION

and increase machine life

with

## SUTTON COLLETS

### *Patented* DIAMOND SERRATIONS Grip Tighter • Self-Cleaning

Stress, strain and wear on chucking cams, roller pins, tubes, fingers, shoes and other machine parts depend on the amount of tension required on the collet for a positive grip on the stock. The more tension, the more wear. Sutton diamond grip collets, which require about one-third less tension, reduce wear throughout the chucking mechanism. Here's why:

Diamond serrations take horizontal and rotating thrusts at an angle, with a wedge grip. Dirt, scale and chips work out more easily, maintaining full bearing on the stock.

Take out production insurance on your automatics with Sutton Collets—now!

### SUTTON TOOL COMPANY

2895 W. Grand Blvd. • Detroit, Michigan

See our Representative or send for Catalog No. 14A

COLLETS • FEEDERS  
MASTER COLLETS AND PADS  
MASTER FEEDERS AND PADS  
PARTS AND ACCESSORIES  
for lathes, milling machines,  
hand and automatic  
screw machines



# SUTTON

# COLLETS

Crater-Eliminator, is slowly dropped to zero at the end of a weld. This action is accomplished through a shading pole-type reversible motor which operates a rheostat, thus varying the welding current. A push button on the electrode holder of the welding unit is pressed at the top of the weld and again at the end of the weld, thereby automatically changing the current from maximum to normal to low without disturbing the arc. Since the rheostat automatically returns to the "hot-start" setting, no time is lost in starting the next weld.

For the welding of thin gauge metals at extremely low currents, the Allis-Chalmers Crater-Eliminator is said to add greatly to the appearance and strength of the weld.



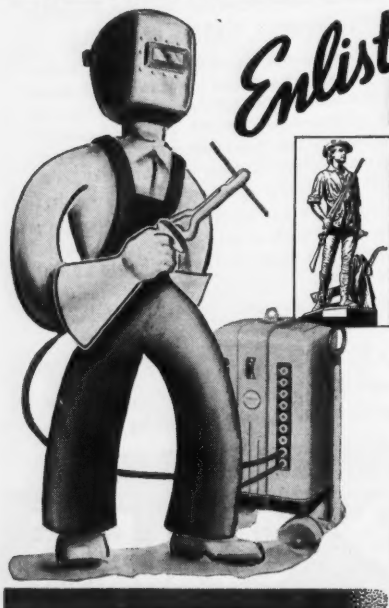
Schrader Pneumatic Foot Pedal

### Schrader Pneumatic Foot Pedal

Designed to reduce operator fatigue and accidents to a minimum and at the same time speed up production, the Schrader Pneumatic Foot Pedal shown in the illustration has been placed on the market by A. Schrader's Son, Division of Scovill Mfg. Co., Inc., 470 Vanderbilt Ave., Brooklyn, N. Y. The pedal

can be operated by the toe of the foot without lifting the latter off the floor. Either foot can be used in operating the pedal.

The Schrader Pneumatic Foot Pedal is readily portable and is designed to permit various angles of approach.



## Enlist **MARQUETTE'S MINUTEMAN** of 1942

A versatile MARQUETTE A.C. WELDER used to fabricate tools, dies, drill jigs and fixtures soon pays for itself in savings of precious man-hours of labor and "hard to get" tool steel. The speed and economy of electric welding will produce these items for you at a fraction of the time and cost required by old fashioned methods. Strength and accuracy are assured with a minimum of machining necessary.

Send for free, 24-page, illustrated booklet.

MARQUETTE MFG. CO., INC. • Minneapolis, Minn.

# MARQUETTE

REG. U.S. PAT. OFF.

## A.C. ARC WELDERS



# 6 REASONS WHY THIS GRINDER IS THE BEST

## EXTRA WEIGHT



## EXTRA BEARING AREA



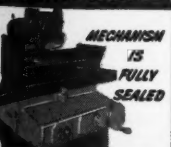
## DIRECT DRIVE



## MASSIVE COLUMN



## PROTECTIVE SADDLE



## NEW HYDRAULIC DRIVE



# "MOST ACCURATE ★ ★ ★ WE EVER SAW"



L. Offerman Tool & Die Co., New York City, write this about their DoAll Grinders:

## New DoAll PRECISION GRINDER

"We now use 4 DoAll Surface Grinders in our shop, operating on an average of 20 hours a day. They are the most accurate machines we have ever seen, and are doing a splendid job. Our work is of the most exacting accuracy, consisting of snap gauges and we also do a great deal of profile grinding of an intricate and difficult nature. Most of the work has to be held within tolerances of .0001" to .0002".

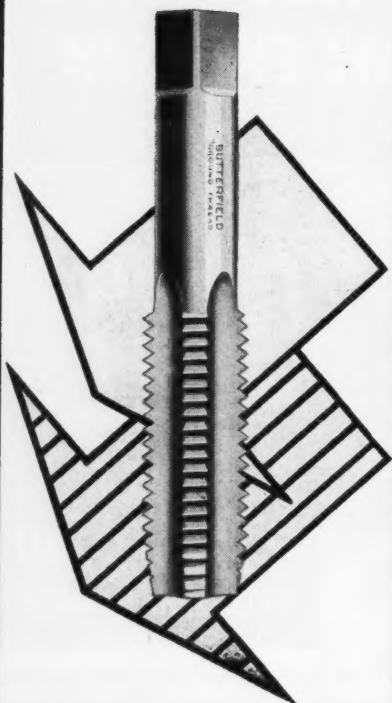
For faster, vibrationless precision grinding, investigate the DoAll, the grinder that's years ahead in all-around performance and accuracy.

Write for interesting circular today.

## SAVAGE TOOL CO.

DEPT. MM, SAVAGE, MINN.

# BUTTERFIELD TAPS



Where thousands of tapped holes must be produced day after day to a tolerance of .001 of an inch—specify "BUTTERFIELD" Commercial Ground Taps.

## UNION TWIST DRILL CO. BUTTERFIELD DIVISION

Factories: DERBY LINE, VERMONT, U. S. A.  
Athol, Mass.; Mansfield, Mass.;  
Rock Island, Quebec, Can.

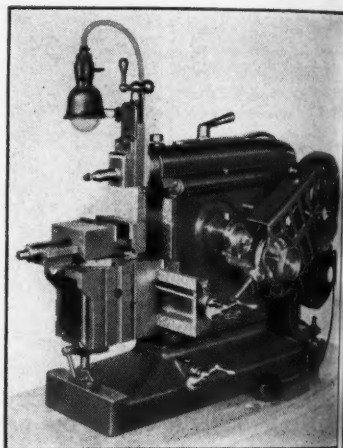
### STORES:

Cleveland	3346 Superior Ave.
Chicago	11 S. Clinton St.
Detroit	6540 Antoine St.
New York	61 Roade St.

Where work necessitates standing away from the machine, the pedal can be brought out to permit practical operation in an erect position.

## Ammco 7-Inch Precision Shaper

Available for stationary installation or mounted on portable cabinet, a 7-inch precision shaper designated as the Ammco is announced by the Automotive Maintenance Machinery Co., 2104 Commonwealth Ave., North Chicago.



Ammco 7-Inch Precision Shaper

Ill. Features include quick adjustment of stroke, feeds, ram position, toolhead speeds, table height, and table support. The ways of the ram, toolhead, and front face of the main frame are of the V-type. The toolhead is graduated from 0 to 90 deg. for angle work. The feed mechanism is of the reversible and adjustable type, feeds varying from 0.003 to 0.018 inch.

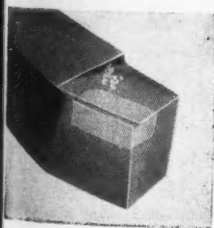
The vise of the machine is made of semi-steel and is mounted on the table by means of a single bolt and held in position with a key. The base of the vise is provided with slots for three working positions of the table. The base is graduated for any angle from 0 to 90 deg. either side of center. The jaws have steel insert plates.

The countershaft of the machine has a four-step V-pulley with separate adjustment for V-belt and motor belt.

# Send for this VEST POCKET MANUAL



Showing how to get  
the **MOST** from your  
**KENNAMETAL TOOLS**



STYLE 12

• This new KENNAMETAL production aid is crammed full of usable information for machinists. Its 48 pages . . . more than 100 illustrations . . . and sections on Selecting, Designing, Using, Brazing and Grinding tell you simply and completely just how to apply KENNAMETAL for the utmost in production speed and efficiency. Its handy vest pocket size makes it convenient to carry, for instant reference. Write today for your free copy.

KENNAMETAL is harder, stronger and more "crater-resisting" than other steel-cutting carbides. Use it, and speed up your production of steel parts.



## McKENNA METALS Co.

300 LLOYD AVE., LATROBE, PA.

Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York  
Exclusive of Canada and Great Britain



Pulleys and belt are enclosed in hinge-type safety belt guard for quick change of belt.

## Challenge Duplex Bench Block

A line of duplex bench blocks is now being manufactured by The Challenge Machinery Co., Grand Haven, Mich.



Challenge Duplex Bench Block

The blocks have working surfaces both top and bottom and are available in three styles or combination; namely, with one surface smooth and the other grooved in  $\frac{1}{4}$ -inch width for lapping of metal-to-metal joints; with both sides smooth, in which case one surface may

be used for working purposes and the other held in reserve for layout, assembly, and inspection; and with both surfaces grooved for lapping  $\frac{1}{4}$ -inch mesh.

The Challenge Duplex Bench Blocks are precision ground both top and bottom, smooth or grooved surfaces. They can also be supplied with either or both surfaces hand scraped. The projection of the top and bottom surfaces provides a convenient ledge for clamping measuring instruments.

The Challenge Duplex Bench Blocks are 10 inches wide, 14 inches long, and 2 $\frac{1}{2}$  inches high. The blocks are made of special analysis semi-steel, carefully ribbed internally to assure rigidity and strength, and are specially heat-treated to relieve strain.

## Denison Model DLOS2 HydroOILic Press

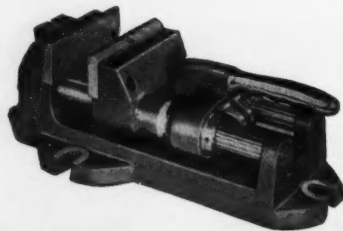
Known as the Model DLOS2 HydroOILic Press, a highly versatile hydraulic press available in capacities of 50 tons and up has been announced by The Denison Engineering Co., 110 W. Chestnut St., Columbus, Ohio. The press can be adapted to a wide range

## Can You Equal This Speedy Production Vise ?

### Easier to Operate! Easier to Adjust!

Simply move sliding jaw up to work, then press down on lever. To disengage, just raise the lever and the jaw moves away from work. Quickly adjusted to different pressures for different kinds of metals, eliminating danger of distortion.

The only vise with a jaw that travels from "closed" to maximum opening (4 $\frac{1}{2}$ " ) at single movement of lever. Saves time in getting the work in and out of vise. Ideal as a drill-jig milling fixture, and for tool-room use.



Supplied with or without jig bushing plate. Saves time and cost of making special drill jigs for small production jobs.

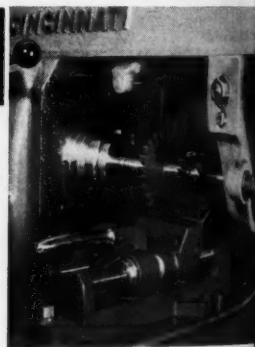
**D. A. SMITH & CO.**

8085 Livernois

Detroit, Mich.

Free CATALOG

**PRESTO-VISE**



# GRINDING THE WAY TO VICTORY

## CHICAGO MOUNTED WHEELS



• Speed and Smoothness in cutting action — Longer Life—that's what you get when you use Chicago Mounted Wheels.

Made in all types of abrasives, grains and grades, mounted on shanks of different diameters and lengths—there is a Chicago Mounted Wheel to lick every grinding job from the most intricate cartridge dies to snagging hard-to-reach parts on tanks. For high-speed POLISHING, the sensational new Chicago Soft Rubber Mounted Wheels save hours of tedious hand work.

Illustrated is a group of wheels mounted on  $\frac{1}{4}$ " diameter shanks, for use with portable and precision equipment. These are one-half actual size. Hundreds of other shapes are available on  $\frac{3}{32}$ ",  $\frac{1}{8}$ " and  $\frac{3}{16}$ " diameter mandrels.

### TRY ONE FREE

That's the quick way to learn first-hand about these remarkable wheels. Tell us the kind of job, size and wheel speed you use and we'll send a test wheel postpaid.

**CATALOG**—Covers the complete line of Chicago Mounted Wheels and time-saving accessories for use with portable tools. Send for copy today.

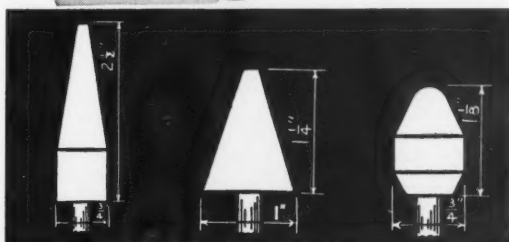
## CHICAGO WHEEL & MFG. CO.

Makers of Quality Products for 40 Years

1101 W. Monroe St.

Dept. MM.

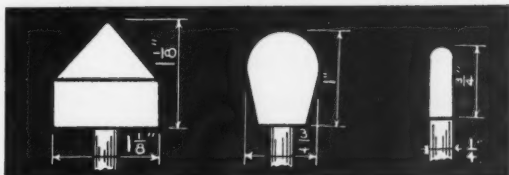
Chicago, Ill.



No. A-1

\*No. A-2

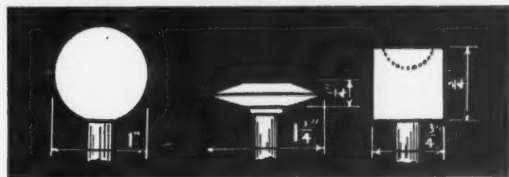
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\*No. A-13

\*No. A-23

No. A-24



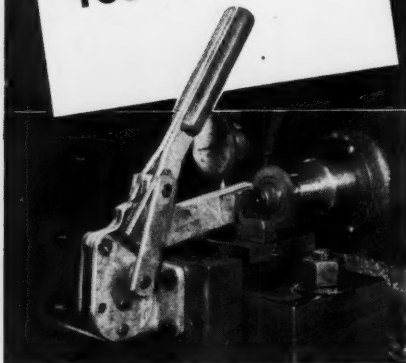
\*No. A-25

No. A-37

\*No. A-38

\*This shape also available in Soft Rubber Polishing Bond

**What angle—  
What position—  
What space—  
required for  
YOUR CLAMPING?**



**YOUR ANSWER:**

## **KNU-VISE** TOGGLE ACTION **CLAMP**

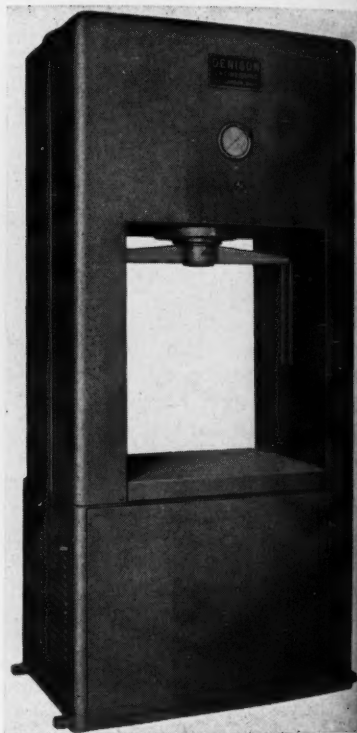
After base is fastened permanently in vertical or horizontal position, clamp can be swung to any angle between 90 to 180 degrees, thereby giving versatility in clamping work. Clamps exert unyielding bull-dog grip, which can be instantly released by throw of handle. Same powerful pressure is applied on each successive operation—no delays experienced in making time-consuming adjustments—production carries on without interruption.

**KNU-VISE**  
INCORPORATED

16839 Hamilton Ave.  
HIGHLAND PARK MICHIGAN

of straightening, assembling, and pressing operations in either small-lot or production work.

The press is of rugged, streamlined construction and is completely self-contained. Controls are safely and conveniently located, and the ram is threaded internally for attaching as-



Denison Model DLOS2 HydroOILic Press

sembling, bending, or straightening tools.

The ram and cylinder head assembly is located in the top part of the body frame, and the directional control valve and its operating mechanism, the motor, pumps, tonnage controls, and reservoir are located in the base of the press. The press is furnished with hand-lever or electrical control, which is arranged so that tonnage applied to the work is controlled by the operator in accordance with the requirements of the operation.

To operate the Model DLOS2 press



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MULTIPLE  
POINT AND

SINGLE POINT  
GRINDING WHEEL DRESSERS  
WITH DIAMONDS

SET IN SINTERED TUNGSTEN CARBIDE

ASK FOR NEW 16 PAGE DESCRIPTIVE BOOKLET AND PRICE LIST

# DIA- TOOL INC.

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May, 194

20 YONKERS AVE., YONKERS, N.Y.

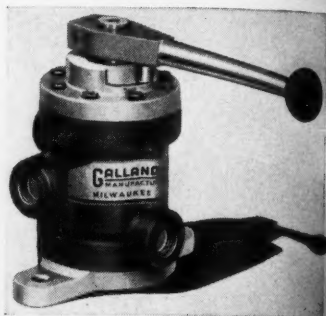
the control lever is pushed down, thus causing the ram to move downward at rapid-traverse speed until it contacts the work, exerting a minimum of tonnage. To increase the tonnage applied to the work, the control lever is moved further downward by the operator. When the control lever is released, the ram moves upward until the upper stroke stop on the shipper rod is reached, moving the control valve to the neutral position. The pump and motor then run idle, consuming a minimum of horsepower, and the ram is held in place HydroOilically.

For electrical control, the press is equipped with two operating push buttons requiring hand tie-up, since the press will not operate if only one button is pushed. The press will continue to exert pressure until the push buttons are released, at which time the ram will return to its normal position.

### "Nopak" Hy-Pressure Hydraulic Valve

Designed to eliminate strenuous and tiring valve-lever manipulation and a tendency toward "pressure-locking," a

high-pressure hydraulic valve to be known as the "Nopak" Hy-Pressure Hydraulic Valve, is now being marketed



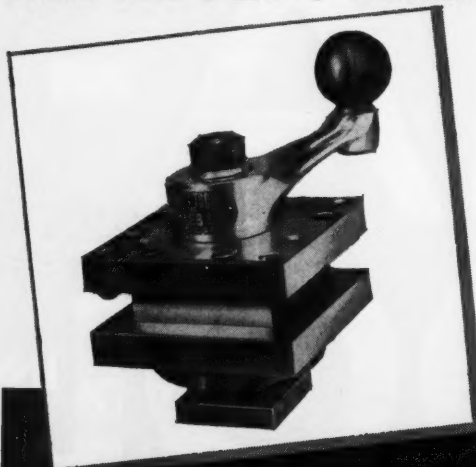
"Nopak" Hy-Pressure Hydraulic Valve

by the Galland-Henning Mfg. Co., 210 S. 31st St., Milwaukee, Wisconsin.

Since the hydraulic pressure inside the valve is always balanced, the valve, it is claimed, can never become "pressure locked." According to the manufacturer, the lever of the unit is just as easy to operate from the "on" position as

## IMPROVED! Mastercraft Turret Tool Post

Always A Superior Tool  
...Now Greatly Improved



Faster action for top production—Hardened throughout, for longer service—Self compensating for wear in hard use—Precision built for accuracy.

The new Mastercraft Turret is a fast indexing 4-way tool post for repeat operations on the engine lathe or for front cross slide on the screw machine. Especially designed for use on 9" and 10" South Bend Lathes, Sheldon, Clausing, Atlas, Logan and similar bench lathes and small screw machines.

Order through your jobber or write for literature.

**MASTERCRAFT TOOLS**

**F & M SALES CO.** • Hollywood, California  
Manufacturers and Selling Agents

# Keep 'em Cutting...Longer...Faster



## SUNOCO EMULSIFYING CUTTING OIL PERMITS HIGHER **P-Q\*** FOR PRESENT MACHINES

This is no time to worry over priorities on machine tools. Your urgent job is to set and maintain a higher P-Q\* (Production Quota) with present equipment . . . and SUNOCO EMULSIFYING CUTTING OIL will help you do it!

SUNOCO has long been the choice of the leaders in the metal working industry. They know SUNOCO's high lubricating and heat absorbing qualities permit more pieces per tool grind . . . enable machine tools to op-

erate at rated capacity plus . . . make possible finer finishes, closer tolerances, fewer rejects.

Let SUNOCO help you set a higher Production Quota. Call in a SUN "Doctor of Industry" — a metal working expert. Let him prove the merits of SUNOCO for stepping up production in your own shop . . . under your own operating conditions. Write today to SUN OIL COMPANY, Philadelphia, Pa.

\*Production Quota



### PETROLEUM PRODUCTS

HELPING INDUSTRY HELP AMERICA

from the "neutral." As a result, the valve is said to greatly increase the productivity of high-pressure hydraulic machinery and eliminate undue fatigue on the part of the operator even when the valve is manipulated rapidly for hours at a time.

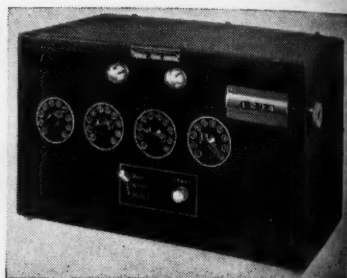
The Nopak Hy-Pressure Hydraulic Valve has only one moving part, a feature which, together with the simplified design, makes the valve practically wearproof and reduces maintenance to a minimum. The valve is built in four sizes to fit the most commonly used sizes of hydraulic pressure lines; namely,  $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ , and 1-inch lines.

### Monitor Model PDC-E Electric Predetermined Counter

Designed for efficient count controlling, an electrically-operated predetermined counter designated as the Monitor Model PDC-E has been developed by the Production Instrument Co., 702-12 W. Jackson Blvd., Chicago, Illinois.

Any number from 1 to 9999 can be quickly set up on the unit by simply turning the knob pointers to the proper digits. When the count reaches the pre-

determined number thus set up, a control and signal circuit is closed (or opened). This circuit may be used to



Monitor Model PDC-E Electric Predetermined Counter

sound an alarm or operate a relay to perform any desired function. Counting ceases at the predetermined number until a reset lever is depressed, thus making the instrument ready for a new count cycle. To change the predetermined number, the knob pointers are merely turned to the proper digits before resetting the counter.

## "Accurate Engraving With Unskilled Operators" Engrave Iron, Soft Steel, Copper, Brass, Aluminum, Plastics on the Auto-Engraver

**Flat or Round Surfaces**



**Write  
for Complete  
Details**

**Price Complete  
\$225.00**

Letters are engraved from master type (block and script letters) furnished with machine. Also designs, emblems, signatures, etc., can easily be traced from original drawings. Engraves on flat and round surfaces. Vise capacity - 4 1/2"x15". Set-up quickly changed. After 30 minutes practice a novice can engrave perfectly.

**AUTO-ENGRAVER COMPANY**

366 FIFTH AVE.

NEW YORK, N. Y.

# CINCINNATI

## ★ HYPRO PLANERS ★

### "step-up" production for prominent Eastern Machine Tool Manufacturer

Designed and built for high production of all types of planer work, this 36" Cincinnati Planer is aiding a prominent eastern manufacturer to increase the production of machine tools to meet the needs of the present emergency. Two of these are shown in the foreground. The close-up shows a Cincinnati planing corners of a wide bar casting for a machine tool.

Modern electric control, centralized oper-

ating levers, forged steel herringbone rack, renewable tee slots (patented), selective dial feed and rapid power traverse to all heads not only facilitate operation and speed up production but assure lasting accuracy with minimum maintenance.

Let Cincinnati Planers help you meet the urgent defense production schedules.

*Write for bulletin.*

## The CINCINNATI PLANER Co.

CINCINNATI OHIO, U.S.A.  
PLANERS • PLANER MILLERS • VERTICAL BORING MILLS



Produces a greater number of smoother cuts per disc.

Eliminates burning and surface hardening. Minimizes burring and disc wear.

**Capacity:** No. 47 W Abrasaw—Solids up to 1" tubing and light sections up to 2" diameter.

**Size of Discs:** Up to 12" diameter, 1/16" to 1/8" thick.

**Capacity:** No. 48 W Abrasaw—Solids up to 2 1/2"—tubing and light sections up to 3 1/2" diameter.

**Size of Discs:** Up to 16" diameter, 1/16" to 1/8" thick.

**WE ALSO MAKE** Resinoid, Vitrified and Silicate Bonded Grinding Wheels, Floor Grinders, Face Grinders, Knife Grinders, Tool Grinders.

**BRIDGEPORT**  
Safety Emery Wheel Co., Inc.  
1297 W. BROAD ST. BRIDGEPORT, CONN.

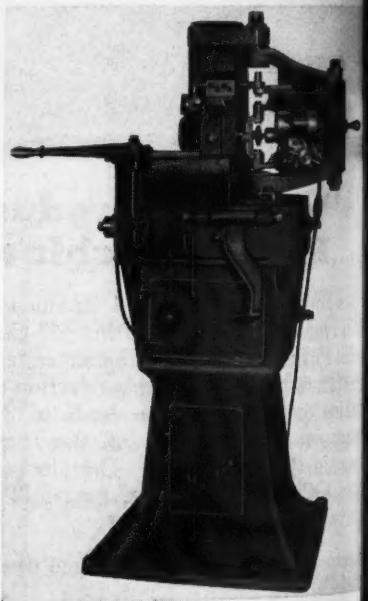


The Monitor Model PDC-E Electric Predetermined Counter is particularly useful in counting objects passing on a conveyor or delivered from a machine. Being electrically actuated, the counter may be located near to or at a distance from the objects being counted. According to the manufacturer, counters of this type are proving very effective grouped in a control room where one operator controls functions at distant points in a plant.

The Monitor Model PDC-E Counter can be actuated by any switch, relay or photoelectric unit with a closed period of 0.035 second or more and an open period of 0.040 second or more.

### Miller Model "A" Profile Grinding Machine

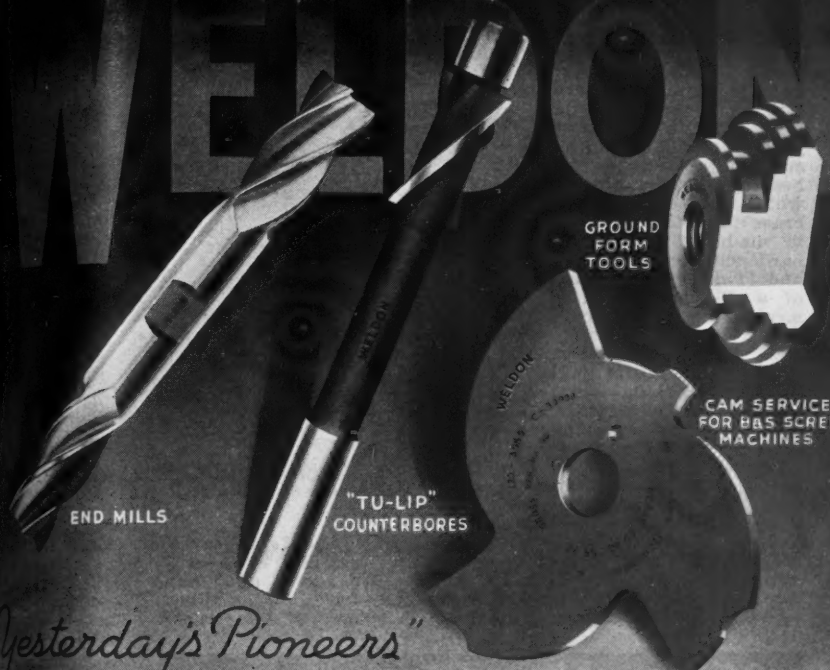
The illustration shows the Miller Model "A" Profile Grinding Machine for grinding tapers and elliptical curves on the end of workpieces which is now being manufactured by the Miller Engineering Machine Co., Newark, N. J. The machine is rubber insulated to ab-



Miller Model "A" Profile Grinding Machine



# WELDON



END MILLS

"TU-LIP"  
COUNTERBORES

GROUND  
FORM  
TOOLS

CAM SERVICE  
FOR HAS SCREW  
MACHINES

*Yesterday's Pioneers"*

*"Today's Leaders"*

These and many other tools are our contribution to the vital defense program now under way.

We are doing our utmost to produce tools in quantities ample to serve your production schedules—but never will Weldon quality be sacrificed despite the tremendous demand for quantity..

Weldon tools will not "let you down" in your efforts to do a share in our country's defense.

**Write for Catalog No. 8**

**The WELDON TOOL Co.**  
1000 WOODHILL RD. CLEVELAND, OHIO

### Lyon Hand-Operated Hydraulic Truck

sorb vibration in base and is equipped with Timken bearings throughout.

The spindle has two sets of tapered Timken bearings, front and back, which are adjusted by brass nuts. The spindle is made of tool steel, hardened and ground, and is driven by means of a V-belt, the drive mechanism being concealed in a housing. Draw-in collets are used on both ends of the spindle, and a locking device is provided to hold the spindle while chucking work.

The Miller Model "A" Profile Grinding Machine has a heavy cast iron swivel type frame. The bearings provided in the frame are of large type and, being of tapered construction, can be screwed down, thereby providing an absolutely rigid bearing and, at the same time, affording free access to the operation of the frame.



### Lyon Hand-Operated Hydraulic Truck

The Lyon-Raymond Corp., 911 Madison St., Greene, N. Y., has introduced a heavy duty hand-operated hydraulic truck for handling long strips of sheet metal. The truck is designed to keep

## CERRO ALLOYS for Prompt Shipment



**CERROMATRIX** (Melting Temp., 250° F.) For securing punch and die parts, anchoring machine parts without expensive drive fits, for engraving machine models, stripper plates, chucks, short run forming dies and other metal-working applications.

**CERROBASE** (Melting Temp., 255° F.) For reproducing master patterns, models for electroforming, engraving machine models, proof casting for forging dies, etc. Perfect reproduction of intricate detail.

**CERROBEND** (Melting Temp., 158° F.) Used as a filler in bending thin-walled tubing in small radii. Easily removed in boiling water. Also used for aircraft assembly jigs, templates for forming dies and other purposes.

These three low-temperature-melting and expanding alloys are helping to speed up production of war materials for the Army, Navy and Air Force.

#### Representatives and Distributors

Brooklyn, N. Y., Belmont Smelting and Refining Works  
Ansonia, Conn., Jackson Associates  
Boston, Mass., Jackson Associates  
Philadelphia, Pa., Machine & Tool Designing Co.  
Cleveland, Ohio, Die Supply Co.  
Detroit, Mich., Castaloy Manufacturing Engineers  
Chicago, Ill., Sterling Products Co., Inc.  
Moline, Ill., Sterling Products Co., Inc.  
Milwaukee, Wis., Harry C. Kettleson, Inc.

St. Louis, Mo., Metal Goods Corporation  
Kansas City Mo., Metal Goods Corporation  
Tulsa, Okla., Metal Goods Corporation  
New Orleans, La., Metal Goods Corporation  
Dallas, Tex., Metal Goods Corporation  
Houston, Tex., Metal Goods Corporation  
Los Angeles, Calif., Castaloy Mfg. Engineers  
Montreal, Can., Dominion Merchants Ltd.  
London, Eng., Mining & Chemical Products, Ltd.

**CERRO DE PASCO COPPER CORPORATION**  
40 WALL STREET - NEW YORK, N. Y.

# These Low-Cost METAL-CUTTING BAND SAWS Can Help You *Right NOW*

When you are confronted with an urgent need for immediate increased production in connection with the U. S. armament program—check into the possibilities of using this 14-inch Delta metal-cutting band saw. It is ideal for cutting . . .

- Aluminum Castings
- Aluminum Sheets
- Hard Cast Brass
- Soft Cast Brass
- Brass Sheets
- Brass Tubing
- Cast Iron
- Copper
- Metallic Hose
- Cold Rolled Steel
- Carbon Tool Steel
- Bronze & Manganese
- Drill Rods
- High Speed Steel
- Monel Metal
- Nickel Steel
- Iron Sheets & Bars
- Pipe
- Malleable Iron
- Babbitt
- Bakelite and Molded Plastics
- Asbestos & Felt
- Brake Linings
- Fibre & Mica
- Slate & Transite
- Hard Rubber

## WILL HELP SPEED UP PRODUCTION

There is no limit to the number of jobs you can find for this economical low-cost tool around the general tool and machine shop. And the few uses mentioned above scratch only the surface of the machine's adaptability. Once the machine is installed, there is no end to the number of jobs that are found for it!

## Many Basic Advantages

This machine is not just another metal-cutting saw—but represents sound designing from the bottom up with many new basic features. Four metal-working speeds. Can be switched easily into high speed for soft materials. New Departure self-sealed ball bearings insure trouble-free performance for the entire life of the bearings.

## OTHER DELTA LOW-COST MACHINES



**Cut-Off Machine** cuts speedily and to exact lengths a wide variety of materials.



A complete line of single and multiple spindle 14" and 17" drill presses in slow and high speed models.



**Bench and Pedestal Grinders**—the safest, most accurate and efficient grinders made.

## Send for CATALOG

Send coupon below for latest Delta catalog giving full specifications and prices of Delta 14-inch Metal-Cutting Band Saw. Also prices and details on the complete line of Delta low-cost machines.

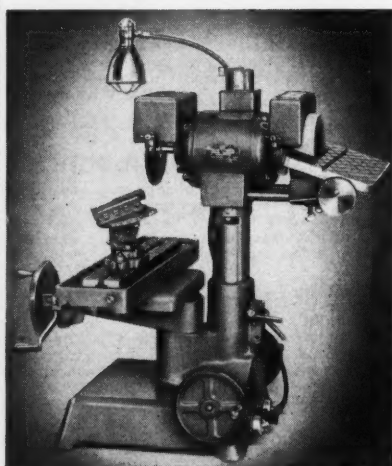


THE DELTA MANUFACTURING CO.,  
601-E E. Vienna Ave., Milwaukee, Wis.  
Please send me catalog of Delta Machines, giving specifications and prices on Delta Metal-Cutting Band Saws.

Name \_\_\_\_\_  
Address \_\_\_\_\_

sheet metal at a convenient height for the operator while feeding the sheets to a punch press.

The unit has a maximum capacity of 10,000 lb. and is equipped with a two-speed hand-operated hydraulic pump. It is also equipped with an attachment which permits a towing hitch to be mounted on the front wheels so that the truck may be conveniently moved with the aid of an industrial power tractor. In addition, the truck is provided with a brake or floor lock which enables it to be locked in position when the operator is feeding sheets into a punch press.



### Another Knock-Out Grinder

The Model A603 Chip Breaker Grinder is another Knock-Out to add to a long line of fine machine tools. Its 11-inch longitudinal table movement makes it ideal for manufacturing operations. Adding a tilting table attachment (above) makes it capable of complete maintenance of carbide-tipped tools. Write for CBG42-5M and Price List.

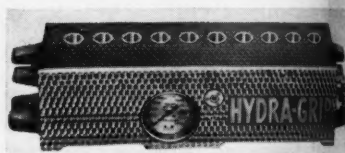
**K. O. Lee Company**

Aberdeen, South Dakota, U. S. A.

The truck shown in the illustration is of the toggle lever type, with 10,000-lb. capacity, fifth wheel steer, two-speed hydraulic hand pump, and front feet arranged for installation of towing hitch. The truck is equipped with a table which is 36 inches wide x 12 inches long and has a lowered height of 18 inches and elevated height of 24 inches. The truck can also be furnished with other capacities and specifications and also with motor-driven pump instead of two-speed hydraulic hand pump.

### Hydra-Grip Hydraulic Work Holder

Hydra-Grip Hydraulic Work Holder for gang-chucking operations are now being manufactured by Intermarine Machine Shop, Inc., 3851 Medford St.



Hydra-Grip Hydraulic Work Holder

Los Angeles, Cal. By means of interchangeable collets, the Hydra-Grip holds 10 pieces of work in accurate alignment for precision machining on milling machines, shapers, grinders, drill presses. Pieces to be machined are dropped into the collets and alignment is instantly made and held by hydraulic pump. To unload, pressure on the workpieces is quickly released by a quarter turn of a valve.



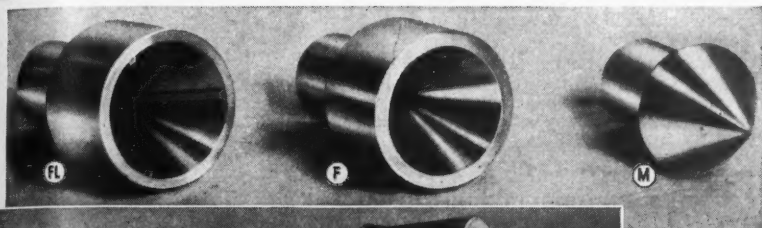
### CENTERLESS GRINDING

ACCURACY — PROMPT SERVICE

Commercial Centerless Grinding Co.  
6603 Cedar Avenue Cleveland, Ohio

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# IDEAL LIVE CENTERS



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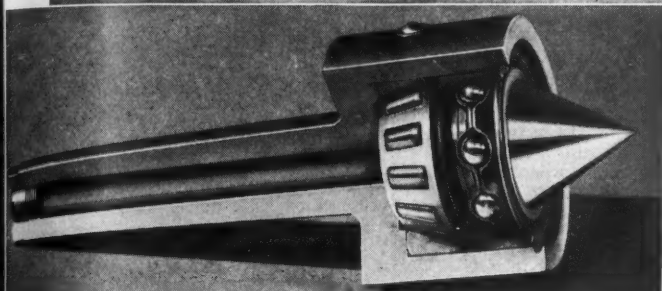
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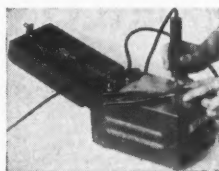
## SPEED PRODUCTION -- REDUCE SET-UP TIME!

Triple-Duty Centers—Three easily interchangeable inserts that can be used with all kinds of centered and uncentered work — an exclusive IDEAL feature. They reduce set-up time on Lathes, Grinders, Millers, Screw Machines, etc. Permit heavier loads, deeper cuts, higher speeds. All parts are hardened and ground to precision standards.

## IDEAL DEMAGNETIZER

Keeps Tools Sharp Longer

Removes metallic chips and dust that dull cutting edges. Quickly demagnetizes work held in magnetic chucks, tools, drills, punches, dies, etc. Powerful; portable; handy to use.



## MARKING TOOLS

Prevent Loss, Theft, Confusion

IDEAL ELECTRIC ETCHER permanently marks on steel, iron and their alloys.

IDEAL ELECTRIC MARKER permanently marks on all materials, glass, metals, ceramics.

**FREE** A Machine Tool Accessory Catalog giving information on many Time-Saving Tools. Yours for the asking.

## IDEAL COMMUTATOR DRESSER COMPANY

1031 PARK AVENUE

SYCAMORE, ILLINOIS

SALES OFFICES IN ALL PRINCIPAL CITIES

In Canada: Irving Smith, Ltd., Montreal, Quebec.

Interchangeable round collets are available in a full range of sizes from  $\frac{1}{4}$  to  $1\frac{1}{4}$  inches, by thirty-seconds. Special sizes and shapes are also available. The controlled wrapping action of the collets ensures a firm grip on all 10 pieces of work.

The Hydra-Grip Hydraulic Work Holder is self-contained unit without outside lines or connections, and its use is said to in no way affect normal machining practice.

### Hammond Independent Dust Collectors

A line of self-contained dust collector units available in three sizes is announced by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. The three sizes, which are designated as the Models 30, 40, and 50, are of a compact functional design, thus requiring a minimum of floor space.

Filtering capacities range from 275 to 1,100 c.f.m. with air velocities in inlet ducts up to 6,000 feet per minute. Two standard inlets are provided on each unit—3 inches in diameter on Model 30, 4 inches in diameter on Model 40, and

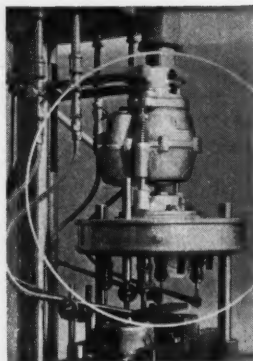


Hammond Independent Dust Collector

5 inches in diameter on Model 50. Inlets in special locations and of special sizes can be furnished on all models desired.

The motor capacity is  $\frac{1}{4}$  h.p. for

## If you need higher TAPPING and DRILLING output--here's your answer!



### Etco-Emrick MULTIPLE HEADS

In the few minutes it takes to attach them, these tapping and drilling heads will turn any drill press into a high-speed, sensitive, interchangeable multiple tapping and drilling machine. Quill Clamps are available for mounting the heads with absolute rigidity.

**BULLETIN No. 3** gives full details about the Heads and the number and size of taps and drills they will handle. A copy will be mailed to you on request.

**ETCO TOOL CO., Inc.**

598 Johnson Ave., Brooklyn, N. Y.  
DETROIT CHICAGO

MAKERS  
OF

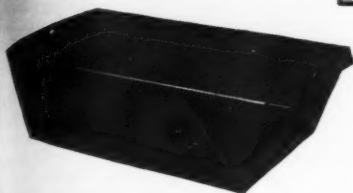
**Etco-Emrick** DRILL CHUCKS • TAP CHUCKS • TAPPING ATTACHMENTS  
MULTIPLE TAPPING AND DRILLING HEADS • TAPPING MACHINES



# STEEL BOXES

## TAPER PANS

One-piece, all-welded construction. Hook handle at each end. Will nest perfectly when empty.



## SHOP BOXES

A straight side shop box with rigid handle and hook hole each end. Excellent for shop use where stacking feature is not required.



## STACKING BOXES

An ideal all-purpose shop box. Sturdy all-welded construction. Heavy skids act as a positive stacking lock and reinforce box at point of maximum wear.



# Immediate Shipment!

No. 101—10"x18"x6"—18 Gauge, each, \$ .75  
No. 102—12"x20"x6"—16 Gauge, each, \$ .90

PRICES F. O. B.  
FACTORY, PHILADELPHIA.  
ANY QUANTITY.

No. 401—10"x16"x6"—18 Gauge, each, \$ .85  
No. 402—12"x18"x8"—16 Gauge, each, \$1.10

ORDER TODAY.  
WRITE, WIRE  
OR PHONE

No. 601—10"x16"x6"—18 Gauge, each, \$ .95  
No. 602—12"x18"x8"—16 Gauge, each, \$1.25

## AMERICAN METAL WORKS, INC.

1519 GERMANTOWN AVE., PHILADELPHIA, PA.

Model 30,  $\frac{1}{2}$  h.p. for Model 40, and 1 h.p. for Model 50. The motor, fan, fan housing, and electrical connections are all fitted in a removable plate, thereby making all moving parts readily accessible for inspection.

The filters are of a "throw away" type made of glass fiber. Three filters are provided in each unit through which the air passes. The filters are easily removed for cleaning or replacement through an opening in the back of each unit. Models 40 and 50 are supplied with a filter shaking mechanism by means of which a large part of the dirt can be shaken from the filters into the bottom pan.

During the operation of the Hammond Independent Dust Collector, the air enters the inlets and passes down to the bottom of the unit over a system of baffle plates which straighten out the air currents and cause the larger particles to drop immediately into the dust pan. In this manner, only the finer particles reach the filters, thereby materially reducing the filter load.

Hammond Independent Dust Collectors are said to have a multitude of applications in connection with various types of grinders in plants which do

not have central exhaust systems and in plants whose central exhaust system is not available to numerous isolated grinders.

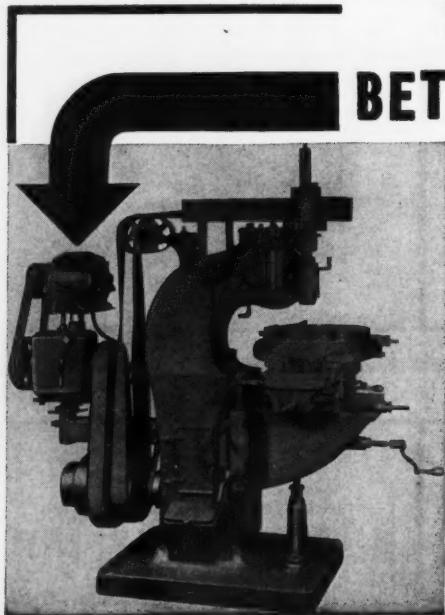
## Progressive "Temp-A-Trol" Forge Welder

Known as the "Temp-A-Trol," a forge welder in which the temperature at the weld itself automatically controls weld and heat-treat current and operating cycle and which is completely self-compensating for all such variations as normal difference in metal thickness, induction and short-circuiting losses, presence of scale, and so on, has been announced by the Progressive Welder Co., 3023 E. Outer Drive, Detroit, Mich.

Designed for resistance welding of heavy sections and special alloy steels, the Progressive Temp-A-Trol Forge Welder both spot-welds and heat-treats the weld. Close control of weld nugget size, ductility, and grain refinement are thus obtained. The welder is also said to avoid annealing of hardened surfaces in plates.

With completely automatic control of weld, heat-treat, and annealing cycles

## The DRIVE to BETTER PRODUCTION



Today, production is all important. Every available machine tool should be utilized and those that are old need modernization—a job that can be efficiently accomplished with a Berkeley Drive.

There is no machine in your plant that we cannot efficiently motorize. We manufacture a drive suited to your requirement. V-belt — Helical Gear — Variable Speed (P.O.S.) — or Quick Change Gear Drive. Each drive is custom-built to your particular machine. This is accomplished by the Arc Welded Steel Bracket Construction.

Get greater production with a Berkeley Drive attachment. Write for details.

**THE BERKELEY EQUIPMENT CO.**  
CORRY PENNSYLVANIA

# IN SERVICE FOR VICTORY



With the winning of this War the dominant thought in the mind of every thinking American; the Winter Brothers Company would again assure you that every effort is being put forth to see that you get the taps to meet your threading needs—Quality Taps, that you may better do your share.

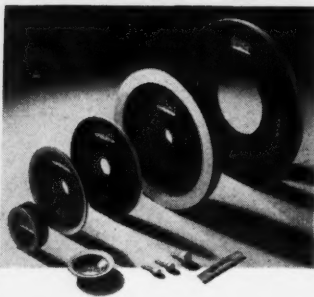


## Winter Brothers

COMPANY  
Wrentham, Massachusetts, U. S. A.



**DIAMOND WHEELS**  
RESINOID  
BONDED  
**SECOMET**

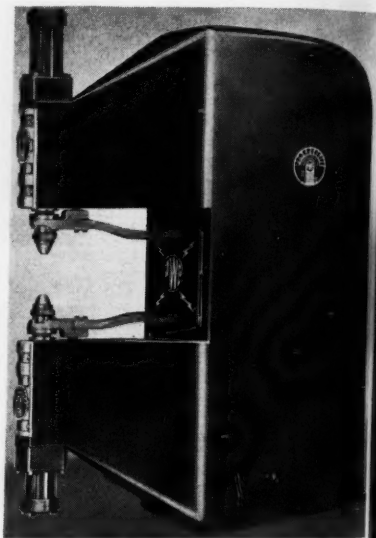


**S**ECOMET Resinoid Bonded Diamond Wheels can do your work more accurately, faster, and without appreciable wear. They are most economical for sharpening cemented carbide and multi-bladed tools, such as milling cutters, broaches, etc. Moreover, their sharp, free-cutting action eliminates lapping and the usual semi-finish grinding operation. Catalog on request.

*Prompt deliveries*

157 Chambers St.  
New York  
N. Y.  
**J.K. SMIT & SONS, Inc.**

the Temp-A-Trol is said to reduce the human element in selecting weld and heat-treat cycles to a mere setting of the dials to the actual temperatures desired. Another advantage of controlling welding current and cycle through weld temperature is that it provides automatic compensation for current loss due to varying amounts of work introduced into the throat of the welder. As the temperature increases, the current loss due to induction increases.



Progressive "Temp-A-Trol" Forge Welder

thus causing a variation in the actual amount of welding current. The Temp-A-Trol control is also said to compensate for current loss through adjacent completed welds.

### Ellstrom Internal Setting Gage

Designed to eliminate the old-fashioned slow method of setting instruments and gages by using clamps and parallels with gage blocks, the Ellstrom Internal Setting Gage shown in the illustration has been placed on the market by the Dearborn Gage Co., 2203 Beech St., Dearborn, Mich. According to the manufacturer, the gage surfaces of the unit are processes and finished to millionths in flatness, thereby making

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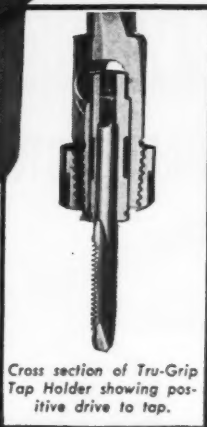
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May, 1942

# More Efficient Tapping at Lower Cost . . .

*Here's why Procunier Tapping Heads  
give This to you*



Cross section of Tru-Grip  
Tap Holder showing pos-  
itive drive to tap.

The exclusive advanced design of the new Procunier Tapping Heads assures you accurate tapping at high speeds with automatic protection for taps! Tap is driven by a double-cone, cork-faced friction clutch which automatically regulates tap driving power by pressure applied through the drill press spindle. Operators can quickly detect dull or loaded taps by the "feel," or pressure on the clutch, required to drive them thus avoiding needless tap breakage. With this sensitive Procunier smooth-operating friction clutch, bottom tapping is as simple as through

tapping, since the clutch instantly slips should the tap strike bottom or stick due to tap loading. Built to stand up under hard service. Many other features. If you want to reduce your tapping costs

## SEND FOR BULLETIN

giving full details, description and prices on complete line of Procunier Precision Tapping Heads to meet all needs. The new Tru-Grip Tap Holder—and also the full line of Procunier Universal Tapping Machines, hand or foot operated.

Procunier Safety Chuck Co.  
12 S. Clinton St.  
Chicago, Illinois

Send me bulletins on: ☐ High Speed Tapping Heads  
☐ Tru-Grip Tap Holders ☐ Universal Tapping Machines

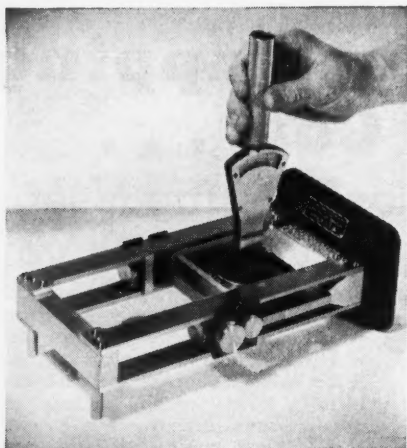
Name

Address

City  State

# PROCUNIER SAFETY CHUCK CO.

12 S. CLINTON ST.  
CHICAGO, ILLINOIS



Ellstrom Internal Setting Gage

ing possible the ultimate in checking with a minimum of adjustment. For example, if the gage is adjusted for a 2-inch reading and a 1.875-inch reading is desired, all that is necessary is to

ring a 0.125 gage block on the bottom surface of the gage, thus immediately giving a 1.875-inch check.

Another feature of the Ellstrom Gage is that it can be used either vertically or horizontally to facilitate adjustment. The gage illustrated will cover readings up to 6 inches. Other models can also be made for any specific job within a reasonable range.


Constructed of very fine steel, the Ellstrom Internal Setting Gage is quickly and easily adjusted by two thumb screws on each riser. The gage is 12 inches high overall and has a base of 4 x 6½ inches.

### Matthews No. 201 Fuze Marking Machine

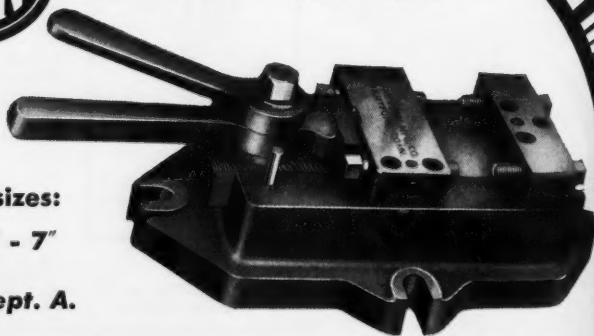
Manufacturers of fuze parts, fuze assembly plants and fuze loading plants can now mark the outside surface of the fuze body or part with a stamped impression by using the Matthews No. 201 Fuze Marking Machine, made by Jas. H. Matthews & Co., 3944 Forbes St., Pittsburgh, Pa. Practically all sizes and models of fuzes can be marked with this machine.

Fuze bodies, fuze parts or room

# TO SPEED UP MILLING, DRILLING, TAPPING AND ASSEMBLING



## QUICK ACTION VISES



**Three sizes:**  
4" - 5" - 7"

**Write Dept. A.**

## THE FENN MANUFACTURING CO.

### HARTFORD, CONNECTICUT



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immediate

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OR TOOL

ING AND  
ASSEMBLING  
CO.

# Friction!

## REDUCED!

THROUGH THE USE OF  
**EMPIRE TOOL COMPANY'S**

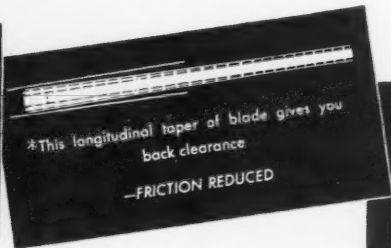
LUERS PATENTED

## CUTTING-OFF BLADES




This "T" shaped blade gives you liberal side clearance

—FRICTION REDUCED



\*This longitudinal taper of blade gives you back clearance

—FRICTION REDUCED



This hollow-ground top of blade relieves restriction of chip expansion

—FRICTION REDUCED

## No More Troubles in Cutting-Off Operations

The elimination of excessive friction — the cause of nearly all breakdowns in cutting-off operations — brings you elimination of many troubles. Breakdowns disappear — tools stay on the job for longer periods — more work produced in any given time — work is made easier — less attention to operation required — all these features spell more efficient production for you — made possible by the unique design and construction of the blade.

- PRODUCTION IS INCREASED
- DOWNTIME IS REDUCED
- NUMBER OF REGRINDS CUT DOWN
- WASTE TIME AND MATERIAL ELIMINATED

Luers Patented Cutting-off Blades are used on any type of hand or automatic screw machines. Write us on your letterhead the make and size of your machine, and we will let you try these tools in your own plant so you can fully realize their high efficiency. Very simple to operate — even in hands of unskilled help.

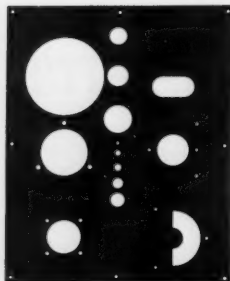
\* Blades, both tapered and parallel on the longitudinal cutting width, carried in stock.

The Blades that reduce friction

**EMPIRE** Tool Co.

8774 Grinnell Ave.  
Detroit, Mich.

# SHOP ORDER: —MAKE 8 PIECES AS SHOWN



16 gauge (.062") mild steel  $8\frac{1}{8}" \times 10\frac{3}{16}"$

14 different dies used requiring 14 turret positions

Set up time—4½ minutes

Time to pierce 32 openings

including turret rotation

—3 minutes, 40 seconds

Time to produce first piece

—8 minutes, 10 seconds

Time for next seven pieces

—3 minutes, 40 seconds each

Produced on Wiedemann

Type R 41-P

## DOES SET-UP MEAN UP-SET ON A JOB LIKE THIS?

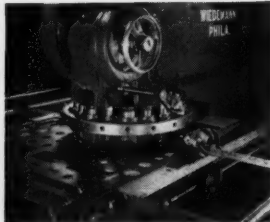
No need to upset your entire production line for this short-run piercing job. Cut literally hours of layout and set up time by depending on a **Wiedemann Turret Punch** with gauge table attachment.

One Wiedemann in any shop will make a by-pass around production jobs that will pay for the machine in short order. A Turret Punch Press eats up small quantity work because that's the job they're built to do.

If it's costing you more than its worth to tear down a production set-up to do a lot of important but bothersome small run jobs, look into the amazing facts of economy in piercing with a Wiedemann Turret Punch Press with the locating gauge table. You'll be surprised at the speed and accuracy of this specialized equipment. Write today for **FACTS**.

**WIEDEMANN MACHINE CO.**  
1821 SEDGLEY AVE. PHILA., PA.

This type R41-P is locating and piercing to close tolerances special radio chassis and panels in less time than a skilled operator can lay out one piece.



pieces to be marked are fed by hand from right side of the machine up to the continuous rotating pressure table. Under marking pressure, the part being marked rotates against the pressure dial to complete the marking.

The marked piece on the opposite side of the machine is removed by an ejecting plate which sweeps the part off the dial as it continues the cycle.

The pressure dial on the flat bed



Matthews No. 201 Fuze Marking Machine

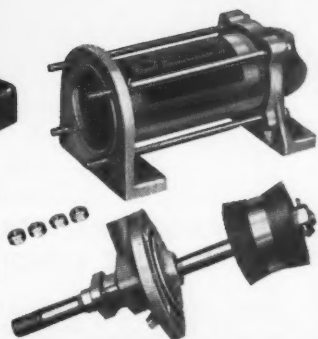
the machine is finished to match contour of the piece to be marked. The dial can be removed and other dials of different size and shape parts assembled. Type holders are concave in shape to the marking diameter of pressure dial, plus diameter of part to be marked. Type holders are also shaped accordingly to match vertical contour of conical parts to be marked, such as fuze body parts.

To quote on machines, drawings showing size and shape of part to be marked and required marking, and position of marking are necessary.

Production capacity: Depends on

# Hanna Cylinders

**DEPENDABLE** *Power*  
**TO PUSH, PULL, OR LIFT...**  
*on 1001 Jobs*



No costly shutdowns or maintenance worries with simple, sturdy Hanna Cylinders. Nothing wears but packings that are quickly replaced. The unique strain rod and flange construction permits piston removal without complete dismantling. Strain rod nuts come off — that's all!

## HANNA ENGINEERING WORKS

1765 ELSTON AVENUE

CHICAGO, ILLINOIS

Air and Hydraulic  
**RIVETERS**

Air and Hydraulic  
**CYLINDERS**

Air  
**HOISTS**

MODERN MACHINE SHOP 265

May, 1942

May, 1942

speed with which parts are fed. Floor space: 24 x 30 inches.

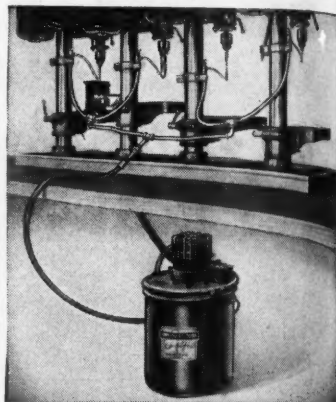
## Gray Models G-2 and G-3 Portable Controlled-Flow Coolant Pumps

Two large capacity portable controlled-flow coolant pumps designed for easy attachment to drill presses, lathes, grinders, saws, tappers, milling machines, and other equipment are announced by the Gray-Mills Co., Inc., 217 W. Ontario St., Chicago, Ill. "Flo-Bac" Coolant Pans and Fittings for use with the pumps are also announced.

Designated as the Models G-2 and G-3, the pumps have capacities of 75 and 130 gallons per hour with pressures of 20 and 30 lb. respectively. Features of the pumps include portability, control of coolant flow from small stream to full flow by simple wing nut, capacity to withstand continuous operation, ease of replacement of all wearing parts, ability to handle coolants of all but extreme viscosities, easily cleaned strainers, and so on.

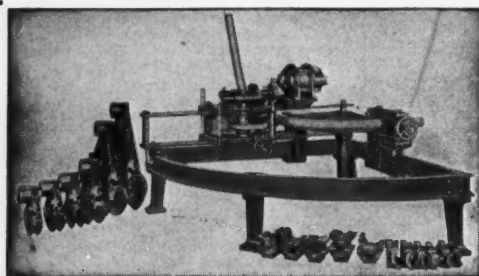
The Model G-2 pump is recommended for one to four-spindle drill presses, lathes, small hand screw machines,

grinders, and small milling machines. The Model G-3 pump is recommended for four to six-spindle drill presses, cut-



Four-Spindle Bench Type Drill Press Equipped with Gray Model G-3 Portable Controlled-Flow Coolant Pump and "Flo-Bac" Coolant Pan

off machines, large milling machines, large hand screw machines, and lathes



## THE AMERICAN COLD PIPE, CONDUIT AND TUBE BENDING MACHINES

QUICK DELIVERIES . . .

HAND OPERATED TYPES in capacities of 1 in., 2 in., 3 in., 4 in. MOTOR OPERATED in three capacities, ½ in. to 4 in., ½ to 6 in., and ½ in. to 8 in.

Early shipments on hand operated machines; on motor powered from four to six weeks.

Wire or air mail letter for printed matter and prices.

Three New Machines: No. 1—For bending extra heavy pipe up to 3 in. No. 2—For bending all kinds of thin gauge tubing without use of mandrel. No. 3—For bending IPS conduit.

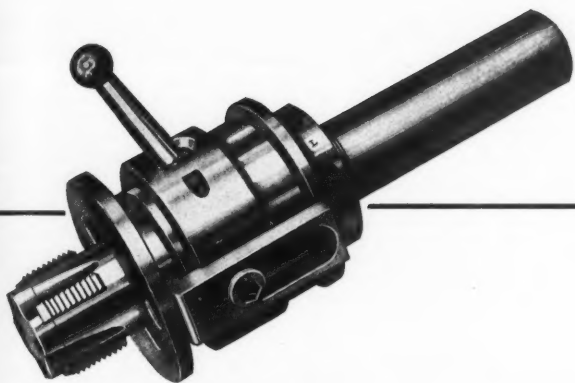


## AMERICAN PIPE BENDING MACHINE CO., INC.

25 PEARL ST.

BOSTON, MASS., U. S. A.

**FOR NATIONAL  
DEFENSE  
We Are Ready  
To Serve You**



# COLLAPSING TAPS

## KIND?

Class S (Note its rugged simplicity).

## WHAT FOR?

Internal Threading—Universal Tap for Stationary and Rotary use. (Adjustable to suit desired tolerances . . . allow sharpening of chasers).

## WHY?

Produces Better Threads . . . Saves Money . . . Time . . . Trouble.

## REASONS?

Solid, sturdy chasers, rigidly supported, withstand heavy strains.  
 ... Ample chip space insures smooth cutting.  
 ... Positive trip.  
 ... Precision built.

## RESULT?

Clean, accurate screw threads! !

**CATALOGUE?** Make request.

**THE GEOMETRIC TOOL COMPANY**

NEW HAVEN, CONN.

NC.  
U. S. A.

"Flo-Bac" Coolant Pans and Fittings are available from stock for many standard machine tools as well as for special adaptations. The pans and fittings can also be built to order for any machine tool.

### Snap-On Improved Torqometer

Snap-On Tools Corp., 8032-C 28th Ave., Kenosha, Wis., announces an improvement in the construction and operation of its Torqometer for measuring the tension of nuts and bolts. Accord-



Snap-On Improved Torqometer

ing to the manufacturer, the unit is, for all practical purposes, free from any inherent friction, thus assuring torque readings on the instrument dial which are accurate and not affected by friction in the tool itself. There are no springs in the tool. The entire torque measuring action and dial mechanism is built as a complete unit, and the

streamlined case and handle are simply a protection for the instrument and means for comfortably using it.

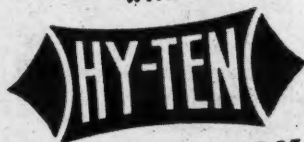
The Snap-On Torqometer can be preset to any torque load and is used to set a series of bolts to an equalized predetermined tension or torque, thus eliminating mechanical distortion caused by unevenly tensioned bolts or nuts. The Torqometer is available in seven sizes with capacities of 0 to 15 inch lb., 0 to 600 inch lb., 0 to 150 foot lb., 0 to 350 foot lb., 0 to 600 foot lb., 0 to 1,000 foot lb., and 0 to 1,500 foot pounds.

The five smallest sizes are available with or without flashlight signal for indicating when pre-set required tension is reached. On the two largest sizes this light is standard equipment. The light signal is especially useful where lighting conditions make it difficult to read the dial. Constant use of the instruments at their highest capacities is said to have no detrimental effect on their working parts.

### Wallace No. 1-M Radial Saw

Illustrated herewith is the Wallace No. 1-M Radial Saw for metal cutting

Reduce your Die Costs  
with



"M" TEMPER ALLOY STEEL

.70 Carbon Cr-Ni-Moly Oil  
Hardening.

Rounds, Squares, Flats for  
Immediate Shipment.

**WHELOCK, LOVEJOY & CO., INC.**

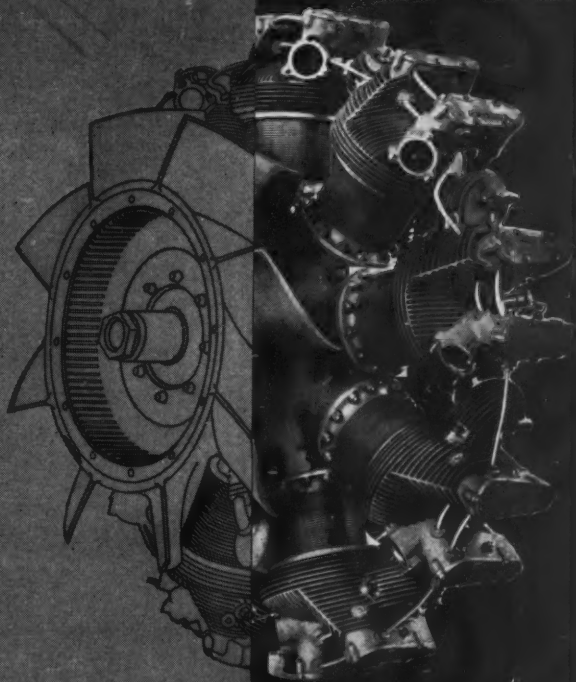
130 SIDNEY ST.

CAMBRIDGE, MASS.

CLEVELAND • CINCINNATI • CHICAGO • DETROIT • NEWARK • PHOENIX



# CUTTING ENGINE PRODUCTION TIME



Bath Taps are helping to cut tapping time all through our "offense" program because of their consistent accuracy and long life.

Bath Taps are hardened, tempered, toughened — then ground from the solid.

Radial type diesel engine for Army tanks, shown with special fan, but without shrouding and baffles.

## BATH TAPS

JOHN BATH & COMPANY, INC. • WORCESTER, MASS.

# INCREASE Shop Effectiveness *with* **HOLLOWELL** SHOP EQUIPMENT

1367 Bench combinations to meet every normal and special shop need in the most efficient manner. Each has rigidity without costly bolting to the floor, interchangeable parts, extra sturdy construction, tops of wood, steel or Masonite.



Exclusive is the wide range of widths and heights of leg sizes "Hollowell" Benches provide for varying requirements.

Pat'd. and  
Pat's. Pend'g.

SEND FOR CATALOG TODAY.

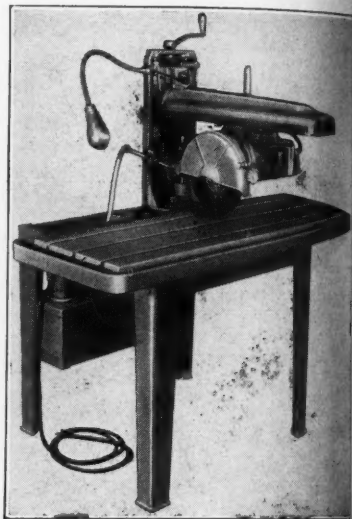
**STANDARD  
PRESSED STEEL CO.**  
JENKINTOWN, PENNA.

Boston  
Detroit  
Indianapolis

Box 556

Chicago  
St. Louis  
San Francisco

which is now being manufactured by J. D. Wallace & Co., 139 S. California Ave., Chicago, Ill. The machine is equipped with a cast iron T-slotted table for use in holding materials of irregular shape or for clamping vises



Wallace No. 1-M Radial Saw

fixtures in any desired position.

The motor unit and blade or abrasive wheel slide back and forth on the radial arm of the machine, which is designed for use in cutting hard and soft steel, angle iron, brass, bronze, Duralumin and aluminum, plastics, brick, and other materials. The column, arm, and motor can all be rotated 360 deg. and may be locked in any position for cutting

Four to six  
Stems impo  
production  
on the avera  
rate, rugged  
radial drill  
structed, str  
...so excess  
Ideal for ne  
ators, especi  
without fatig

*Precision* **GEARS**

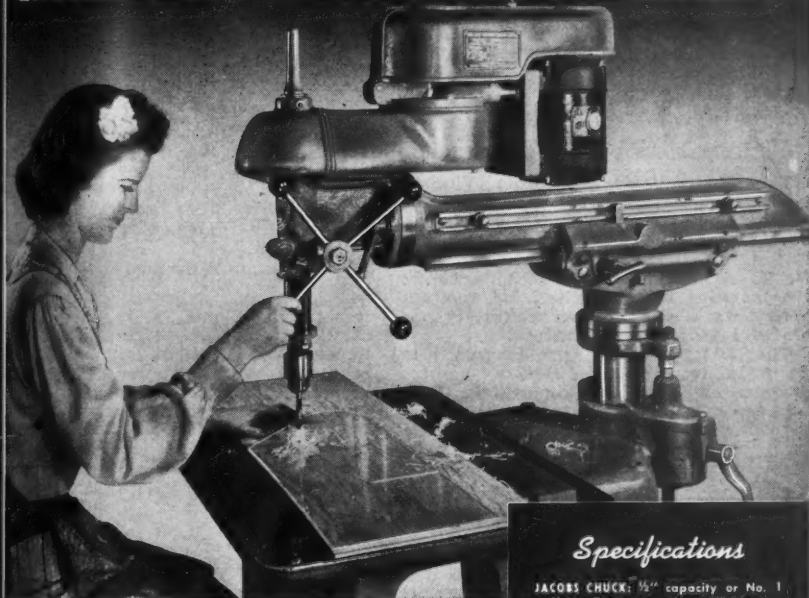
5/8" TO 16"

ANY MATERIAL

**DETROIT BEVEL GEAR CO.**

Mfrs. of Quality Gears for 30 Years  
8130 JOS. CAMPAU AVE. • DETROIT, MICH.

# Prompt Shipment on WALKER-TURNER RADIALS!



Four to six weeks shipment for a WALKER-TURNER RADIAL DRILL! Seems impossible in these crowded days, but efficient large scale production methods enable us to make shipment within this period, on the average, to companies engaged in war production. Fast, accurate, rugged, these up-to-date machine tools fill a long-felt need for a radial drill for light drilling, tapping, routing and profiling. Unobstructed, stream-lined simplicity...no complication of levers and dials...no excess weight...less power consumption...less operating effort. Ideal for new, unskilled help, as well as for old-timers. Women operators, especially, find it easy to put in a productive day on these Radials without fatigue.

**WALKER-TURNER CO., INC.**  
732 Berckman Street Plainfield, N. J.



## WALKER-TURNER MACHINE TOOLS FOR METAL, WOOD AND PLASTICS

DRILL PRESSES • BAND SAWS • BENCH SAWS • TILTING ARBOR SAWS • LATHES  
JIG SAWS • RADIAL SAWS • RADIAL DRILLS • BELT AND DISC SURFACERS • JOINTERS  
SPINDLE SHAPERS • GRINDERS • FLEXIBLE SHAFT MACHINES • CUSTOM BUILT MOTORS

### Specifications

JACOBS CHUCK:  $\frac{1}{2}$ " capacity or No. 1 Morse Taper.

SPINDLE SPEEDS: eight — from 160 to 8200 r.p.m. with 1740 r.p.m. motor. Speeds proportionately lower with 1140 r.p.m. motor.

OVERALL DIMENSIONS: height 72", width 31", depth 56".

SHIPPING WEIGHT: 450 lbs.

BEARINGS: sliding ram carried on 8 precision ball bearings. Ball bearing swivel for free horizontal movement.

SIX-SPINDLE SPINDLE: four precision ball bearings, with pulley mounted between two bearings to eliminate belt strain.

CAPACITY: drills to center of 62" circle. Distance nose of chuck to table 13 $\frac{1}{2}$ ". Spindle traverse 2 $\frac{1}{4}$ ". Drill head may be tilted to 45° right or left.

PRICE: \$352.50 F.O.B. Plainfield (Motor extra)

ting simple or compound angles or for ripping work. Stock is held stationary while the motor unit is pushed or pulled to make the cut.

The Wallace No. 1-M Radial Saw has a capacity for cutting material up to 4 inches thick and is designed for use with motors up to 2 h.p. with either single or three phase ratings. Either saw blades or 3/32-inch thick abrasive wheels may be used with the machine, depending upon the type of material to be cut.

### Victory Model Auto Engraver

The illustration shows the Victory Model Auto Engraver for rapid commercial and industrial engraving which has been placed on the market by the Auto Engraver Co., 366 Fifth Ave., New York, N. Y. According to the manufacturer, the machine is best suited for medium heavy work and can be accurately operated by unskilled operators.

The Victory Model Auto Engraver is designed to reproduce letters, names, designs, emblems, and signatures. Letters are engraved from master type furnished with the machine and include both block and shaded script letters.



Victory Model Auto Engraver

Designs, emblems, and signatures are easily traced from original drawings on paper. The depth of cut can be easily regulated by micrometer control, which is said to greatly increase production and reduce loss of materials and time.

The machine is designed to engrave on round or flat surfaces, cutting

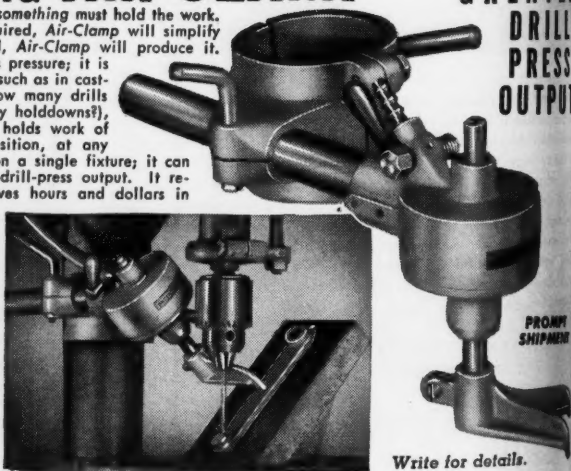
## ANNOUNCING AIR-CLAMP

Wherever a drill comes down, something must hold the work. Wherever a drilling-jig is required, Air-Clamp will simplify it. Wherever speed is desired, Air-Clamp will produce it. Air-Clamp holds with relentless pressure; it is undisturbed by size variations (such as in castings), it scoffs at vibration (how many drills have been broken due to faulty holddowns!), chatter, snagging. Air-Clamp holds work of any size or shape in any position, at any angle. It can pay for itself on a single fixture; it can save its cost on a few days' drill-press output. It reduces operator fatigue. It saves hours and dollars in drafting-room, jig department, tool room and production line. Air-Clamp fits any drill-press having a cylindrical column. Special fixtures for Tee-slotted tables, light milling work, etc. Hand and/or foot control. Shipped on approval to responsible concerns.

### Foot Air Control Ready!



For air-operated devices. Frees hands, speeds work.



PROMPT SHIPMENT

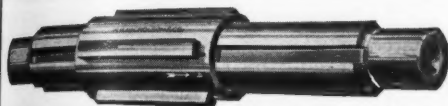
Write for details.

**MEAD SPECIALTIES CO.**

15 S. MARKET ST.

Dept. 52-AA

CHICAGO

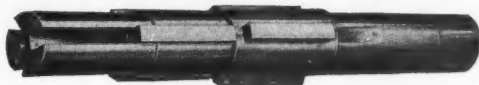


#### TYPE A—STEP JAW DESIGN

Size No.	Range of Bores Taken	Net Price
1A	$\frac{1}{2}$ " to 1"	\$12.00
2A	1" to $1\frac{1}{2}$ "	16.00
3A	$1\frac{1}{2}$ " to 2"	23.00
4A	2" to 3"	34.00
5A	3" to 4"	40.00

# NICHOLSON

## EXPANDING MANDRELS



#### TYPE B—STRAIGHT JAW DESIGN

Size No.	Range of Bores Taken	Net Price
1X	$\frac{1}{8}$ " to $\frac{3}{16}$ "	\$10.00
2X	$\frac{3}{16}$ " to $21/32$ "	11.00
3X	$21/32$ " to $3/4$ "	12.00
00	$3/4$ " to $7/8$ "	14.00
0	$7/8$ " to 1"	16.00
1	1" to $1\frac{1}{4}$ "	18.00
2	$1\frac{1}{4}$ " to $1\frac{3}{4}$ "	21.00
3	$1\frac{3}{4}$ " to 2"	29.00
4	2" to $2\frac{1}{2}$ "	40.00

### ★ step - up production to war-time efficiency

Economy tools . . . for holding work while being machined between centers on lathes, grinders, millers, shapers, etc. Hardened tool steel, accurately ground. Sold singly or in sets. Prompt delivery. Write for bulletin.

Other sizes taking up to 7"  
(Prices subject to change)

W. H. NICHOLSON & CO., 136 OREGON ST., WILKES-BARRE, PA.

## BUILDERS 'T' SURFACE GRINDER

**HANDY** for accurate grinding of dies, tools, and small parts.

**INEXPENSIVE**—it saves valuable time to have several; placed where men can reach them quickly.

**BULLETIN 644**—write for a copy. Prompt delivery on priority orders.

**BUILDERS IRON FOUNDRY**  
19 Coddling Street Providence, R. I.

OR  
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DRILL  
PRESS  
OUTPUT

PROMPT  
SHIPMENT

CO.  
CHICAGO

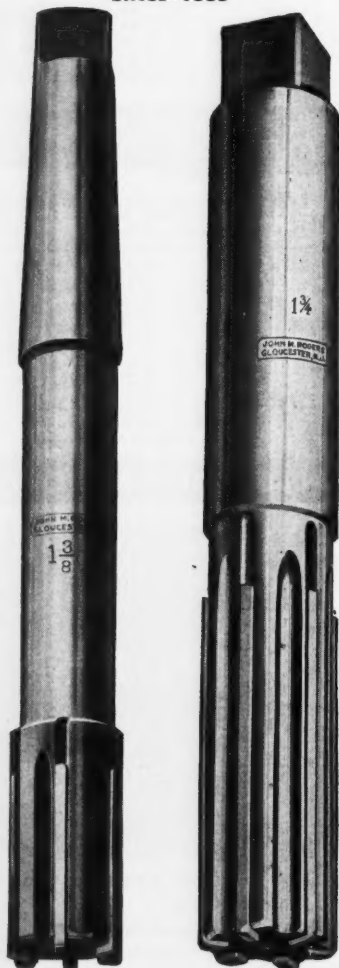
May, 1942

May, 1942

MODERN MACHINE SHOP 273

# ROGERS REAMERS

SINCE 1885



Conserve High Speed Steel by using  
Rogers inserted Blade adjustable-for-  
wear Reamers.

**JOHN M. ROGERS TOOL CORP.**  
GLOUCESTER CITY NEW JERSEY

smooth lines. Due to the minimum number of pantograph arms employed backlash is said to be eliminated. Progress while engraving may be accurately checked by simply rotating stylus arm without disturbing work.

Additional features of the Victory Model Auto Engraver include the ease and speed with which setups can be changed. Pantograph arms can be raised or lowered at will to allow for different heights of work. The copy holder, being specially constructed, is said to permit practically any type of setup and a possible setting of two or more jobs at once.

The machine is provided with pantograph ratios of  $\frac{1}{2}$  to 1 to 5 to 1 and is supplied complete with depth control unit with two feet, two high speed steel cutters, copy holder, type spacers, six copy holder clamps, vise, work table with milled slot, universal motor, one font of 26 shaded script letters  $\frac{1}{8}$  inch high, one font of 78 block letters  $\frac{5}{32}$  inch high, and one font of 20 numerals  $\frac{5}{32}$  inch high.

## Baldor Industrial Battery Charger

The Baldor Electric Co., 4351-59 Duncan Ave., St. Louis, Mo., is now marketing a line of industrial type chargers



Baldor Industrial Battery Charger

designed particularly for charging large batteries used in industrial electric trucks. The chargers are made in two



## EKLIND UNIVERSAL MILLING HEAD



SELF-CONTAINED.  
ADAPTABLE  
TO ANY  
MACHINE

•  
**Mills  
Drills  
Bores**  
At Any Angle

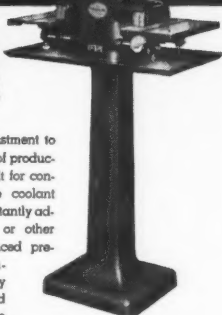
•  
**SPEEDS  
FROM  
250-4000**

•  
**Write for Circular**

**UNIVERSAL HIGH-SPEED TOOL CO.**  
547 W. Washington Blvd. Chicago, Ill.

## The CRITERION Carbide Tool Grinder

**GREATER  
PRODUCTION  
CAPACITY**



Provides positive rapid adjustment to meet the rigid requirements of production tool manufacturing. Built for continuous service. Adjustable coolant system. Large work tables instantly adjustable without wrenches or other tools. One-third H.P. balanced precision bearing motor completely enclosed and radially mounted in rubber. Standard equipment: One 60 and one 100 grit 7" dia. steel backed silicon carbide wheels. Ideal for metal bonded or Resinoid bonded diamond wheels.

Order from your dealer or write direct. Request literature. No obligation.

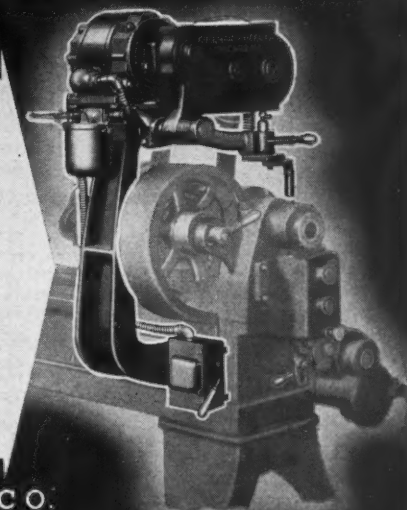
**CRITERION**  
**MACHINE WORKS**  
BEVERLY HILLS, CALIFORNIA

## TRY A CULLMAN DRIVE FOR 60 DAYS —without obligation

Get maximum production from lathe, punch press, shaper, or other shaft driven machine with the modern CULLMAN Motor Drive.

Instant, handy control and belt drive smoothness afford 25% time saving on many operations. The CULLMAN Individual Motor Drive can be installed at a surprisingly low cost. It is made to take motors from  $\frac{1}{4}$  to 15 H. P.

MODERNIZE for greater productivity. Try a CULLMAN Motor Drive in your own plant. Ask for the full facts.



**CULLMAN WHEEL CO.**  
1932 V ALTGELD STREET, CHICAGO, ILLINOIS

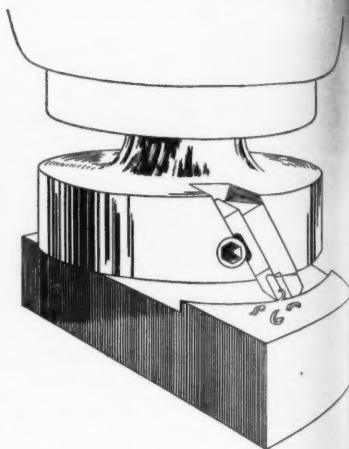
sizes—40 and 80 amperes. Models for charging either lead or Edison cells are available. The chargers can be supplied for manual operation or complete with controls for automatic operation.

be less on a smaller diameter head. The Kennamill Facing Cutter Head

## "Kennamill" Facing Cutter Head

Known as the "Kennamill," a single blade facing cutter head employing Kennametal tools which can be quickly removed from the cutter head and re-ground has been brought out by McKenna Metals Co., 300 Lloyd Ave., Latrobe, Pa. Designed with a large negative spiral angle of 35 to 55 deg. and positive hook of 15 to 25 deg., the cutter of the head is said to mill steel efficiently since Kennametal, it is claimed, does not "gall" or permit the adherence of steel chips to the hard, strong tool tip, which "skids" the steel chips smoothly.

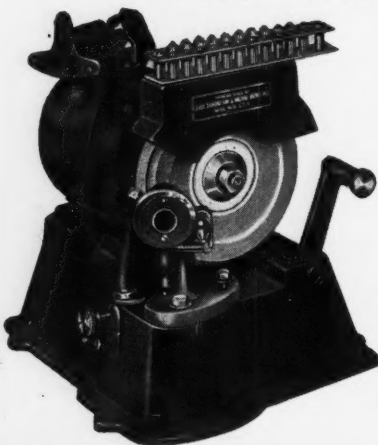
For roughing, with cuts up to  $\frac{3}{8}$  inch deep, a 35-deg. negative helical angle and 15-deg. positive hook on a 12-inch diameter cutter head has been found to work efficiently. For light finishing cuts, a negative helix of 55 deg. with 20-deg. positive hook angle is said to be most efficient. The hook angle should



"Kennamill" Facing Cutter Head

is designed for operation at a peripheral speed of 300 to 600 feet per minute.

## SAVE SKILLED LABOR AND PRECIOUS TIME WITH THE HIGHLY EFFICIENT DRILL GRINDER



## BLACK DIAMOND

FOR SMALL GAUGE AND FRACTIONAL DRILLS

Hundreds of War Production plants are saving valuable time and skilled labor costs by using Black Diamond Grinders for sharpening small gauge and fractional drills.

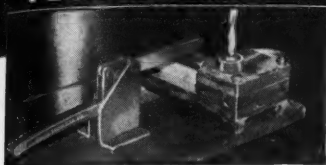
A few minutes instruction makes the most unskilled operator an expert on producing quantities of perfectly sharpened drills with lips of uniform length, correct angle and clearance. To speed war production and save expensive drill stock—to reduce drill breakage and release skilled labor for more important work, install a Bench Pedestal type Black Diamond Drill Grinder at once. Such an investment literally pays for itself in savings in very short time.

The Diamond Dresser keeps the grinding wheel sharp cutting and the Web Thinning Attachment efficiently cares for the grinding of Notched, Crank or Crank shaft points.

Write at once for complete details.

**BLACK DIAMOND SAW & MACHINE WORKS, INC.**  
45 NORTH AVENUE  
NATICK, MASSACHUSETTS

## PECO CLAMPS



### QUICKER-STRONGER

The exclusive patented design of PECO Quick Action Clamps provides exceptional speed of opening and closing and assures a positive lock impervious to pressure and vibration. In models 1561 and 1514 handles are down out of the way when in the locked position, making it easier to get to work when machining, milling or fabricating.

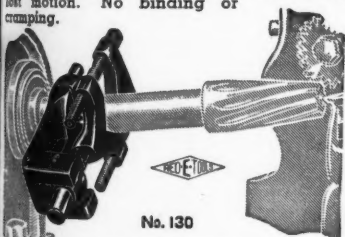
In its full line of seventeen originally designed clamps PECO presents the only clamps with drop forged handles and clamping bars. Send today for catalog on PECO.

**PRODUCTS ENGINEERING CO.**

700 E. FLORENCE AVE., LOS ANGELES, CALIF.

### CORRECT SPACING ASSURED

on straight, spiral or taper work—because ball and socket—sliding member eliminates lost motion. No binding or cramping.



No. 130

RED-E Compensating  
Milling Machine Dog  
Catalog S-41

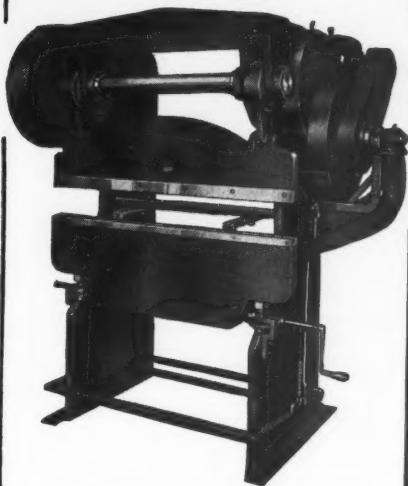
**THE READY  
TOOL CO.**

510 Iranistan  
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Bridgeport  
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## CHICAGO STEEL PRESS

No. 253



### SPEED WAR PRODUCTION OF SHEET METAL WORK

USE FOR . . .

1. FORMING
2. EMBOSING
3. MULTIPLE PIERCING
4. NOTCHING
5. BLANKING

of Ammunition Cases, Bomb Box Liners, Bomb Fins, Aircraft Parts and Many Other Offense Products.

The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

Write for Circular No. 255

**DREIS & KRUMP MFG.  
Company**

7418 LOOMIS BLVD.

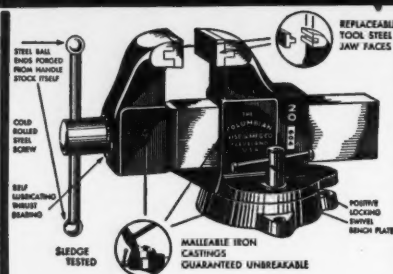
CHICAGO

ILLINOIS

# COLUMBIAN VISES

THE *All-Out* ANSWER  
TO BETTER BENCH WORK

★ ★ ★



★ Because of outstanding features in all Columbian Vises, bench work is done better, quicker and more economically. Columbian Vises assure additional working strength, positive gripping efficiency, maximum capacity and easier operation. There is a Columbian Vise for every need and purpose. Smooth jaw faces are available on Columbian Machinists' Vises. Sold only through Industrial Distributors.

## A COMPLETE LINE MACHINISTS'

(Swivel, Stationary Base, Adjustable Jaw)

- Combination Pipe
- Body Makers
- Heavy Chipping
- Hinged Pipe
- Homeshop
- Woodworkers
- Steel Leg

**THE COLUMBIAN VISE & MFG. CO.**  
9020 Bessemer Ave. Cleveland, Ohio

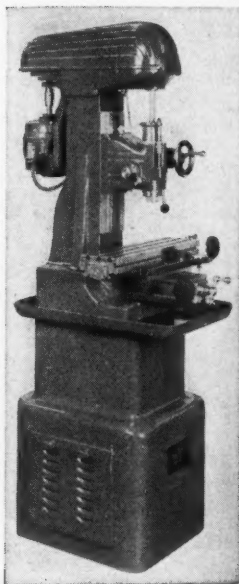
The World's Largest Makers of Vises



with table feed of 0.008 inch per revolution, depending on the material being machined. A 6-inch diameter head when operated at a speed of 390 r.p.m. is said to make possible a table feed of approximately 3 inches per minute. According to the manufacturer, no coolant should be used with the Kennametal since it is impossible to keep the cutting point flooded at the speeds employed.

## Vernon Improved Vertical Mill and Jig Borer

Design and construction improvements in the Vernon Vertical Mill and Jig Borer are announced by the manu-



Vernon Improved Vertical Mill and Jig Borer

facturer—Machinery Mfg. Co., 1915 E. 51st St., Vernon, Los Angeles, Calif.

In addition to closer overall tolerances in construction, improvements in rigidity and operating accuracy have been made. The 6 x 21-inch table has been redesigned for greater rigidity on have the column, knee, and pedestal. Micrometer depth stops have been improved to provide even greater accu-

**Having difficulty holding tolerances?**

**Demand the  
ZIEGLER**

**ROLLER DRIVE**

**Floating Holder  
for  
TAPS and REAMERS**



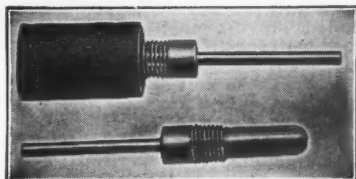
- AUTOMATICALLY compensates for machine spindle misalignment, eliminating over-sized or bell-mouthed holes.
- Helps produce unbelievable accuracy on both new and old equipment.
- Furnished with male or female taper, straight, threaded or special shanks to fit any machine used for tapping or reaming.

**W. M. ZIEGLER TOOL CO.**

1926 Twelfth Street

Detroit, Michigan

**NEW FLEXIBLE  
ABRASIVE WHEEL**



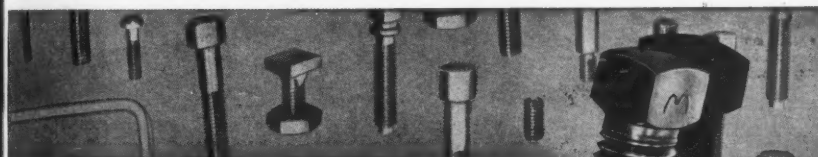
Designed for precision work. Used for removing burrs, fins, tool marks on various types of production work. A very indispensable aid in speeding up production.

*Write for catalog and free sample.*

**Field Abrasive Specialty Mfg. Co.**

201 LOWE BLDG.

DAYTON, OHIO

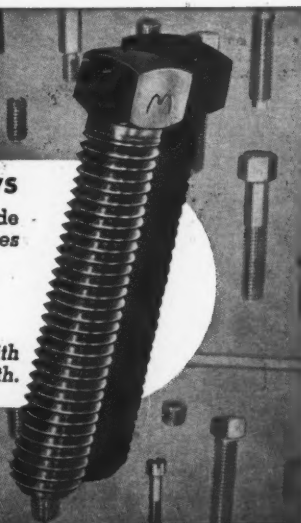


**MAC-IT Quality Alloy Steel Screws**

The Mac-it square head set screw featured here is made for the toughest kind of holding down jobs. Mac-it also makes

- Socket Head Cap Screws • Hollow Set Screws  
Stripper Bolts • Hexagon Socket Pipe Plugs  
Hexagon Head Cap Screws

Made of alloy steel, Mac-its are milled from the bar, with die-cut threads, and heat-treated for maximum strength.



**THE STRONG, CARLISLE & HAMMOND COMPANY**  
1392 West Third St., Cleveland · Ohio

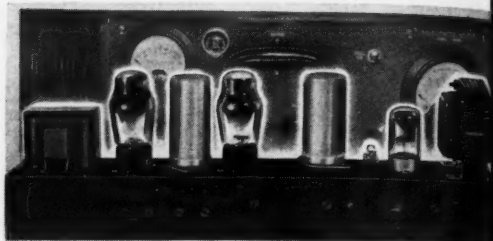
## "Power Pack" for Profilometers

racy when drilling or boring to predetermined depths. Gib locks and independent quill lock have been improved, as well as longitudinal table stop. In addition, a larger chip pan is included on the cast iron base. To accommodate a greater variety of motors, motor brackets have been altered to meet individual power requirements.

The capacity and accuracy of the Vernon Vertical Mill and Jig Borer are said to enable it to perform a wide range of precision toolroom and production operations.

## "Power Pack" for Profilometers

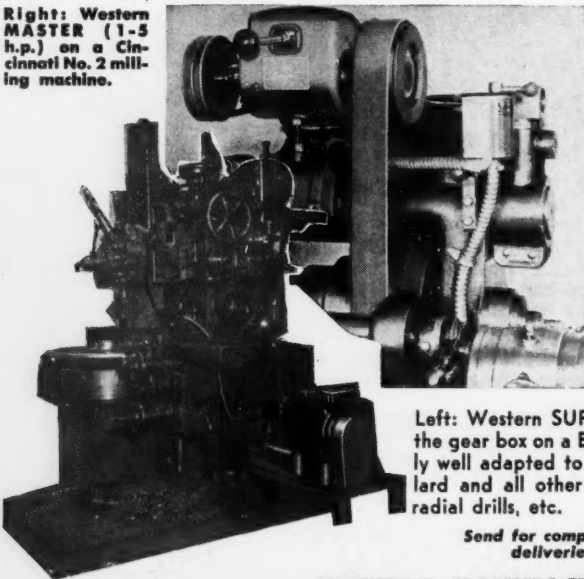
A unit designed to make possible the use of Profilometers on a.c. lines, to be known as the "Power Pack," has been announced by the Physicists Research Co., 343 S. Main St., Ann Arbor, Michigan.



Profilometers, instruments used for the measurement of surface roughness and providing direct dial readings in true inch units, until recently have been self-contained with batteries which permitted complete portability. With the increasing need for their uninterrupted use in one location, particularly on three-shift inspection operations, the Power Pack was developed so that power could be supplied from a 115-volt 50-60 cycle a.c. source.

Existing Profilometers having serial numbers of 75 or greater can be converted for a.c. operation by the installation of the Power Pack, the instruments being returned to the company

Right: Western MASTER (1-5 h.p.) on a Cincinnati No. 2 milling machine.



## WESTERN TRANSMISSIONS

A Western MASTER, capacity (1-5 h.p.), a Western MAJOR, capacity (5-10 h.p.) and a Western SUPER, capacity (up to 30 h.p.) can be installed on lathes, milling machines, shapers, radials, slotters, boring mills, gear cutters, die sinkers, etc.

Left: Western SUPER (up to 30 h.p.) replacing the gear box on a Bullard 42" boring mill—equally well adapted to the 54" and 36" sizes of Bullard and all other makes of large boring mills, radial drills, etc.

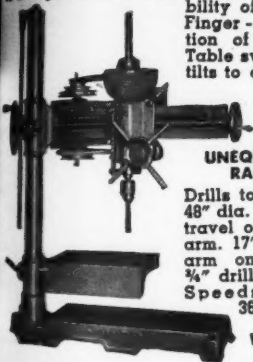
Send for complete information—prompt deliveries on high priorities.

**WESTERN MANUFACTURING COMPANY**  
3404 Scotten Avenue Detroit, Michigan



## MUNDING BENCH RADIAL DRILL

Combines the convenience and accuracy of a sensitive drill, the range and capacity of a large drill, with the speed and flexibility of a radial. Finger-tip selection of speeds. Table swivels and tilts to any angle.



### UNEQUALLED RANGE

Drills to center of 48" dia. circle, 18" travel of head on arm. 17" travel of arm on column. 3/4" drill capacity. Speeds: 175 to 3675 r.p.m.

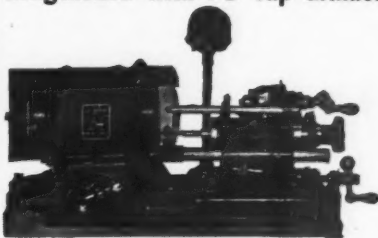
Write for details.

**MUNDING MFG. CO.**

703 East Colorado Blvd.

Glendale, Calif.

## Tap Size Retained and Tap Life Lengthened with J-B Tap Grinder



You can retain the size and extend the life of your taps if you sharpen on a J-B Tap Grinder.

Sharpens right or left hand taps (2, 3, 4, 5, 6, 8 and 10 flutes) uniformly on the chamfer . . . grinds any taper or angle of chamfer desired . . . can be accurately set or quickly changed for amount of relief.

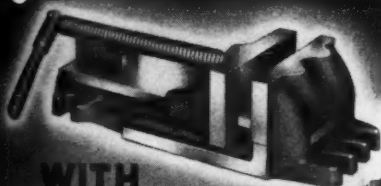
Write for Folder M.

**EDWARD BLAKE CO.**

634 COMMONWEALTH AVE.  
NEWTON CENTRE

MASS.

# Faster PRODUCTION



WITH

**SPEED VISE**

WRITE FOR BULLETIN



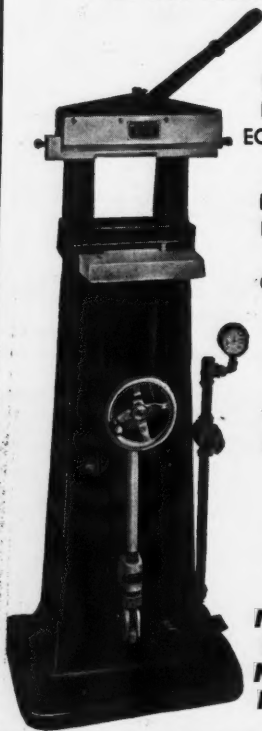
**CARDINAL MACHINE COMPANY**

INCORPORATED

GLENDAL, CALIFORNIA

"The **SPEED VISE** Manufacturer"

**YOUR PRODUCTS  
ALWAYS  
IDENTIFIED  
IF PERMANENTLY  
MARKED  
IN THIS MACHINE**



MARKING  
BY ROLLING  
IS FAST AND  
ECONOMICAL.

PRESERVES  
DIE LIFE AND  
PIECE PARTS.  
REQUIRES  
ONLY FRAC-  
TION OF  
APPLIED  
PRESSURE  
AS COM-  
PARED TO  
STAMPING.

—  
QUICK  
SET-UPS

**MODEL 25  
HI-DUTY  
MARKING  
MACHINE**

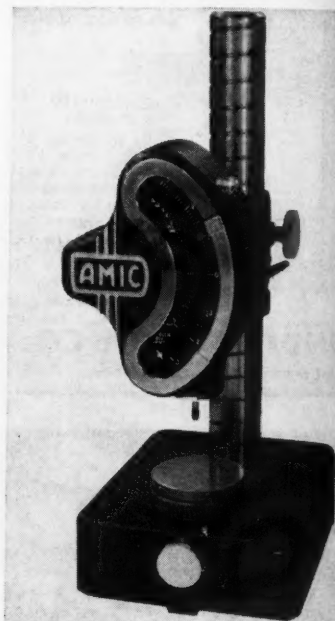
This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

**GEO. T. SCHMIDT, Inc.  
1806 BELLE PLAINE AVE.  
CHICAGO, ILLINOIS**

for this purpose. The unit can also be specified as a part of a new instrument

**"Amic" Comparator**

Designed for the accurate, convenient, and rapid checking of components either in the toolroom or on the production line without fatigue to the



"Amic" Comparator

eyes, the "Amic" Comparator shown herewith has been placed on the market by the American Measuring Instruments Corp., 40 W. 22nd St., New York, N. Y. The working head of the unit is graduated in ten-thousandths of an inch. A displacement of 0.001 inch of the measuring pin causes a movement of the hand on the dial of one full inch. The pointer moves in the plane of the scale, thereby eliminating any error in measuring due to parallel axis.

The interior mechanism of the instrument consists of two parallel flat springs mounted on two parallel vertical surfaces. The springs impart an angular movement to horizontal yokes, the two ends of which are connected

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## SAVING ON GEARS

that puts **MONEY**



**Abart QUALITY — No Extra Cost**  
for Precision Instruments, Machine Tools,  
and Larger Machinery.

ABART Gears last longer—mean fewer re-  
placements—add to PROFITS by reducing  
maintenance. SERVICE and MONEY-SAV-  
ING that "mesh" perfectly.

No stocks. Made only to your requirements.  
Send specifications for estimate.

ABART SPEED REDUCERS—Many types and  
sizes in stock. Write for Catalog.

**Abart** GEAR AND MACHINE CO.  
MANUFACTURERS OF  
Speed Reducers & Gears  
4819 WEST 16<sup>TH</sup> ST. CHICAGO, ILLINOIS

## DIAMONDS for Victory



Cooler dressing  
Closer tolerances  
Micrometer Accuracy  
Because: Wing key  
heat dissipation  
and absolute dia-  
mond lock nib.

Three grades of diamonds. Common quality \$12 per  
carat. Medium quality \$24 per karat. Select quality \$48  
per karat. (Contour template diamonds supplied only  
in Medium and Select quality.)

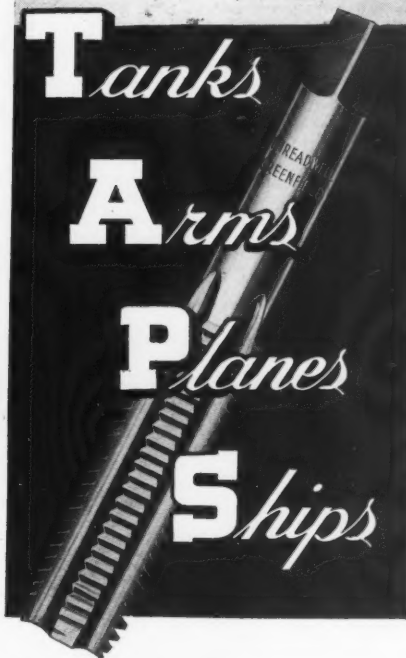
All diamond sizes 1/4 to 10 karat are nib mounted for  
immediate shipment... Billed subject to approval. Spe-  
cial quality of diamond wanted. We recommend a  
minimum size of one karat for each 6" diameter of grind-  
ing wheel. (24 hour resetting service, \$1.00 post paid.)  
Grinders instruction card free.

**DIAMOND TOOL COMPANY, Not Inc.**  
Sheldon M. Booth, Pres.  
93 & E. 41st Street  
CHICAGO, ILL.

## THE NEW NAME FOR SUPERLATIVE THREADING

*Threadwell*

TAPS HELP BUILD BETTER...



WRITE FOR CATALOG  
ON YOUR FIRM LETTERHEAD

**THREADWELL TAP & DIE CO.**  
*in Greenfield, Massachusetts*

SALES AGENTS:

Canada - BRIDGE MACHINERY COMPANY, Montreal  
England - SKYLUX, LTD., London

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by a spring-band which provides a semi-rotary movement of the horizontal axis, which is mounted in jewel bearing and carries the indicating hand. The entire mechanism is said to be practically free from friction and maintain constant measuring pressure throughout the whole range. The base of the indicating hand is formed from an aluminum disc rotating in a permanent magnetic field, which brings the indicator hand to an immediate rest.

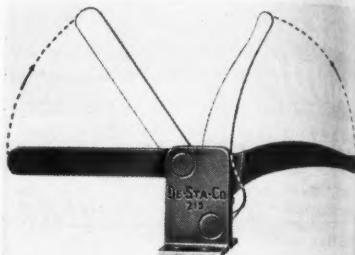
Three means for quickly and accurately setting the Amic Comparator are provided—rough setting by nut and thread on column, fine setting by adjusting screw on anvil, and fine setting by zero adjustment of dial. A lever on the right-hand side of the instrument provides for lifting of the measuring pin to avoid scratching of lapped parts or soft material. Two red marked limit hands control the tolerances required.

Specifications of the Amic Comparator are as follows: magnification, 1000; measuring capacity,  $\pm 0.003$  inch; length of dial, 6 inches; dial graduated 0.0001 inch; distance between graduations, 0.1 inch; distance from column to measuring pin, 4 inches; diameter of anvil,  $3\frac{1}{2}$  inches; height which can be measured, 6 inches; working circle by

swiveling working head, 10 inches diameter; size of base,  $9\frac{1}{2} \times 8$  inches; weight of instrument, 38 pounds.

### De-Sta-Co Model No. 215 Light Duty Toggle Clamp

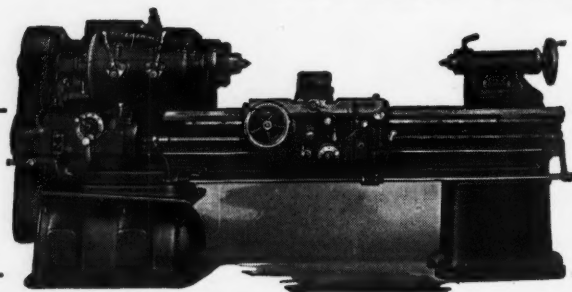
A light duty, horizontal style toggle clamp designated as the Model No. 215



De-Sta-Co Model No. 215 Light Duty Toggle Clamp

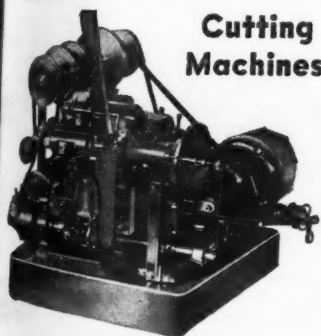
has been added to the De-Sta-Co line of clamps manufactured by the Detroit

## BOYÉ & EMMES ENGINE LATHES



**THE BOYÉ & EMMES MACHINE TOOL CO.**  
CINCINNATI • OHIO

## "Waltham" Pinion Cutting Machines



**FAST AND ACCURATE**

Operator can attend to several machines. For small pinions, a magazine feed shown in the cut allows the machine to run without stopping, materially increasing the production. One, two, or three cuts, according to the nature of the work, may be made.

**Waltham Machine Works**  
WALTHAM, MASS.

## FOR THE DURATION!

- MORE SPEED
- LOWER COSTS



FAMCO Presses step up production and assembly operations requiring percussion and pressure. 40 STOCK SIZES AND MODELS scientifically engineered for greater capacity, size for size, and trouble-free operation.

Write for details.

**FAMCO MACHINE CO.**  
1324 18th St., Racine, Wis.



**famco** FOOT AND ARBOR  
PRESSES

## DIAMONDS FOR DEFENSE



**FOUR FIELDS FOR VICTORY**  
**ON LAND - IN THE AIR - ON THE SEA**  
and - IN THE SHOPS



**WIN THE BATTLE OF PRODUCTION**  
**WITH KARELSEN DIAMOND TOOLS**

**Better Quality - Faster Service**



### SALESMEN WANTED

Write for Territory. Big demand for our products. State qualifications fully. All information in confidence.



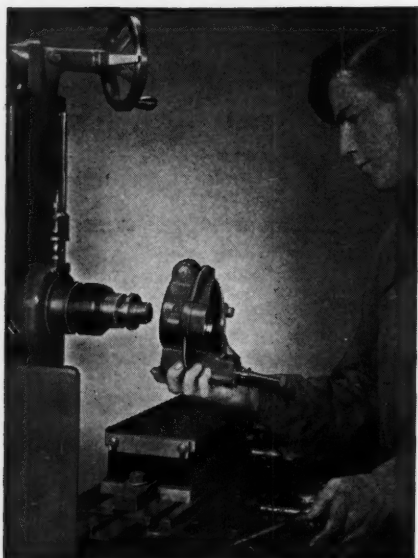
**E. KARELSEN, INC.**

ESTABLISHED 1852

54 W. 45TH ST., NEW YORK, N. Y. Tel. VAN 6-5688

# LIBERTY GRINDING ATTACHMENT

**Gives Your Surface Grinder  
an Extra Hand**



Easily attached to most surface grinders to eliminate expensive set-up time where small wheels are necessary. Grinds slots, recesses and surfaces, etc., which are impossible to reach with large grinding wheel.

Accurately handles a wide variety of tool, gage, die and other grinding jobs. Assembled complete with any size bores, pulleys, belts and grinding wheels at no extra cost.

Write — specifying diameter of spindle head, type and make of grinders.

**Liberty Tool & Gage Works**

235 Georgia Ave. • Providence, R. I.

Stamping Co., 349 Midland Ave., Detroit, Mich. The clamp has a pressure ratio of 50 to 1.

When in "shut" position (as illustrated), both the handle and clamp bar are in a horizontal position, reducing height. The clamp measures  $8\frac{1}{8}$  inches across,  $2\frac{1}{8}$  inches high overall,  $1\frac{3}{8}$  x  $2\frac{1}{8}$  inches at the base, and weighs  $8\frac{1}{2}$  ounces. The illustration indicates movement of handle and clamp bar when clamp is being released to "open" position.

## Given Vari-Speed Drive

An easily adaptable direct drive unit which is said to provide a 30 per cent greater spindle speed range for old ma-



Given Vari-Speed Drive

chine tools and increase their production by providing an ideal cutting speed for any work or cutter diameters is now being marketed by the Given Machine Co., 2014 Santa Fe Ave., Los Angeles, Cal. Known as the Given Vari-Speed Drive, the unit can be used on lathe, drill presses, shapers, planers, boring mills, grinders, milling machines, and





## STRAIGHT SIDE PRESSES

Outstanding in every detail for heavy blanking and forming work.

All stresses are taken centrally.

Write for new catalog illustrating and describing this and other presses.

**ZEN & HAHNEMANN CO.**  
114 VANDERPOOL ST., NEWARK, N. J.

## FAST

### PEERLESS Abrasive Surfacers

These machines are extremely fast for grinding and sanding flat surfaces of metal, wood, rubber, plastics, etc.

Other types Vertical and Horizontal for flat or round work.

**PRODUCTION MACHINE CO.**

GREENFIELD

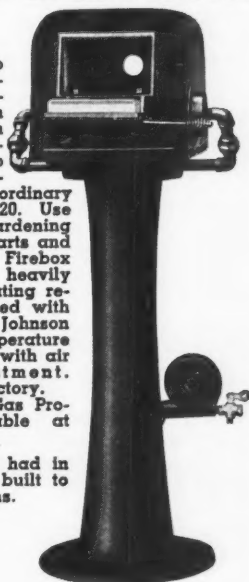
MASS.



## Johnson No. 120 Gives You 2300° in 30 Minutes

Here's the unit to speed up heat-treating of high-speed and carbon steels. You can save 2½ production hours and up to 50% on gas consumption over ordinary units with No. 120. Use it also for hardening punches, dies, parts and cutting tools. Firebox 13½" x 7½" x 5", heavily lined with insulating refractory. Equipped with G. E. Motor and Johnson Blower. Temperature easily regulated with air and gas adjustment. \$129.50 F.O.B. Factory. Automatic Air - Gas Proportioner available at extra cost.

No. 120 may be had in other sizes, and built to your specifications.



### SALES OFFICES:

Bourse Bldg. - - - - - Philadelphia  
120 Liberty St. - - - - - New York City  
C. B. Babcock Co., 475 11th St., San Francisco

## Free

Use Coupon for Free Catalog

### Johnson Gas Appliance Co.

562 E Ave. N.W., Cedar Rapids, Iowa.

Please send me Free Johnson Catalog.

Name .....

Address .....

City ..... State .....

other machines of all sizes and types.

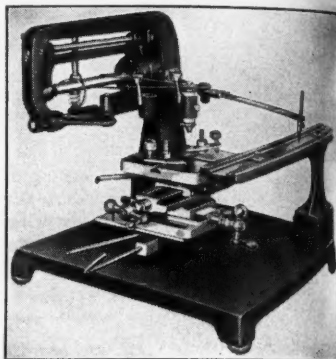
A conveniently located handwheel permits accurate setting of speeds and eliminates all need for shifting belts or gears. Moreover, speeds can be selected instantly without stopping the machine. A single large diameter pulley, cast integrally with the vari-sheaves, and cog-type belt provide direct power transmission with maximum power economy. Balanced sheaves and oversized sealed ball bearings contribute to smooth, vibrationless operation at all speeds. Rotation can be reversed instantly without shock, and adequate means for take-up of all belts are provided. Speeds are said to be constant regardless of load.

The Given Vari-Speed Drive is sturdily built throughout. Balanced, streamlined design and low center of gravity are said to eliminate danger of altering original balance of machine on which the drive is mounted. Installation of the drive is made through a four-belt connection to the machine, and is accomplished in such a manner as to ensure non-interference with proper machine operation. Quiet operation is said to be assured at all speeds.

The Given Vari-Speed Drive is available in sizes from 1 to 10 horsepower.

## New Hermes Type A Pantograph Engraving Machine

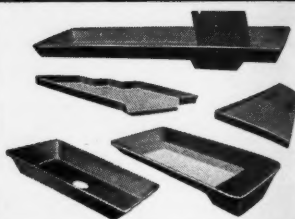
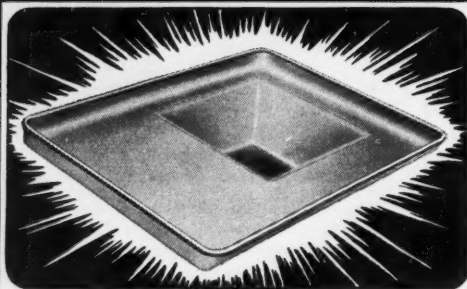
Shown here is the Hermes Type A Pantograph Engraving Machine for high speed industrial and commercial



New Hermes Type A Pantograph Engraving Machine

engraving of medium character which has been brought out by New Hermes Inc., 821 Broadway, New York, N. Y.

# LATHE PANS



Speed up your production by using precision made Lathe Pans delivered to your plant ready to install. Why tie up parts of your plant when you can secure low cost Pans made in a plant set up for this work. Any size or shape can be made with accuracy. Send your blue-prints for prices, today!



## LITTLEFORD

LITTLEFORD BROS., INC.

433 E. Pearl St.  
CINCINNATI • OHIO

Pantograph  
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Machine for  
commercial



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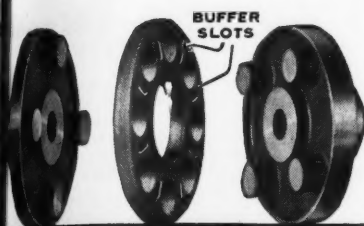
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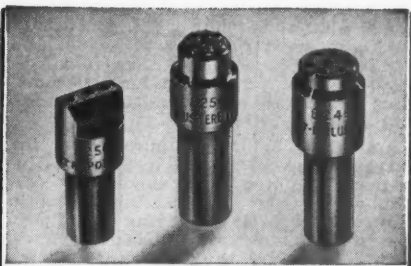
## A MONEY SAVER

The **BUFFER-SLOT COUPLING** lengthens the life of your Motor-Driven Machines by absorbing the load shock and constant vibration that gradually wear out machinery and bring on shutdowns and repairs.

### BUFFER-SLOT COUPLING

It not only gives you all the advantages of the ordinary Flexible Coupling but it goes a step further and restores that cushion driving torque lost when you disengage Belt Drives. It is long lived, dependable and especially adapted for use with machinery having Ball or Babbitt Bearings. **SEND FOR BULLETIN No. 24-M.**

**BROWN**  
ENGINEERING CO. 120 N. THIRD ST.  
READING, PA.



## MEYERS "Dia-Brasive" MULTIPLE DIAMOND POINT DRESSERS

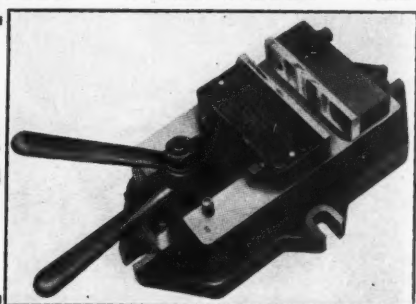
*For Efficient, Economical Service*

With "Dia-Brasive" Multiple Point Dressers, numerous sharp points are always exposed to the work, or face of wheel. New points can be secured by turning dresser a quarter or half turn. The small diamonds are more reasonable in price, and remain sharp longer, than large stones. We also make a complete line of single point diamond dressing tools. Special dressers built to order. Write for new literature.

**W. F. MEYERS COMPANY, Inc.**  
Dept. MS., BEDFORD, IND., U. S. A.

## The Hartford "Four-Point" Milling Vise

**POWER  
SPEED**



**STRENGTH  
ACCURACY**

Operator easily applies tremendous **POWER** with one hand manipulation of both binding and cam-faced handles.

Dual-operation principle of handles **SPEEDS** gripping and releasing and therefore reduces costs.

Maximum **STRENGTH** comes from semi-steel base and movable jaw of single heat-treated steel drop-forging.

Movable jaw, with its ground fitting surfaces, can **ACCURATELY** hold single piece at either end of jaw. Jaws are in absolute alignment.

WRITE FOR BULLETIN

**THE HARTFORD SPECIAL MACHINERY CO., HARTFORD, CONN.**

May, 1942

The machine can be used for engraving brass, aluminum, soft steel, plastics of all kinds, hard rubber, and so on, and is particularly suited for the production engraving of panels, indicator plates, plug sleeves, range finder bands, scales, and similar objects.

According to the manufacturer, the New Hermes Type A Pantograph Engraving Machine is arranged for efficient operation by unskilled labor. Movement of the engraving spindle to and away from work is controlled by spring pressure, thus enabling tracing stylus to be placed in groove of master before bringing the cutter into contact with the work, a feature which is said to result in unusually accurate and fast operation. An automatic depth-of-cut regulator is provided for engraving on flat, slightly concave or convex and uneven surfaces.

The work holder of the machine consists of 7 x 7-inch table and universal vise designed to handle all types of indexing, layout, and spacing work. The vise is adjustable to three dimensions, both vertically and horizontally. The work holder is provided with a cross feed of  $6\frac{1}{2}$  inches and transverse feed of  $5\frac{1}{2}$  inches. Base of work holder, 6

x 7 inches.

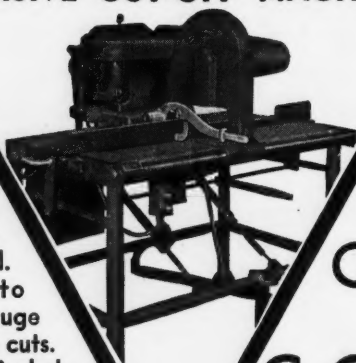
By means of the New Hermes Type A Pantograph Engraving Machine, 9-inch wide objects can be engraved in the center. Larger surfaces can be covered by resetting the work. Additional specifications of the machine are as follows: pantograph ratio, 1 to 12 $\frac{1}{2}$  and to 5; distance from top of vise to engraving cutter, 2 $\frac{1}{2}$  inches; distance from top of work table without vise, 6 $\frac{3}{4}$  inches; motor, 110-120 volts, a.c. or d.c.; overall length of machine, 17 $\frac{1}{2}$  inches; overall width, 21 inches; height, 19 inches, net weight, 74 pounds.

### Miller & Crowningshield No. 3 Hand and Power Feed Milling Machine

Designated as the No. 3, a simply designed milling machine suitable for a wide variety of light production milling operations has been introduced by Miller & Crowningshield, Greenfield, Mass. The machine is available with power feed attachment which can be easily disengaged for short milling cuts by means of rack and lever hand feed.

## ABRASIVE CUT-OFF MACHINES

Three models available dry method only. Wheel furnished in 12", 14" and 16" diameter. Precision bearings in mandrel. Maximum safety to operator. Mitre gauge available for oblique cuts. All models complete including motors. Prices upon application.



CUT  
YOUR  
CUTTING  
COSTS

CUT ANYTHING: PIPE, BARS,

SHAFTING, ANGLES, CHANNELS

**THE MINUTE-MAN MACHINE CO.**

CINCINNATI . . . . . OHIO

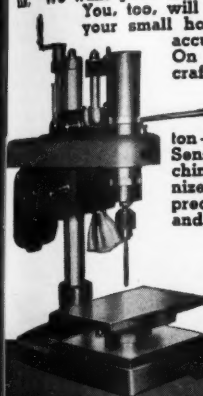
# MAXI-JR.-E.

## Super Sensitive Drilling Machine

Customers on sending in repeat orders tell us: "We want your machine—it's 'Tops'."

You, too, will find it "tops" on your small hole drilling where accuracy is essential.

On instrument, aircraft, Diesel, and any other type of precision drilling, the Hamilton-Muehlmann Super Sensitive Drilling Machines have a recognized superiority in precision, sensitivity, and economy.



Write for catalog.

HAMILTON  
DIVISION

**The Hamilton Tool Co.**

## High Speed VERTICAL MILLING MACHINE and JIG BORER

with Micrometer Screw Feed  
Quill

Smooth, accurate boring to any predetermined depth up to 3". Direct reading eliminates errors.

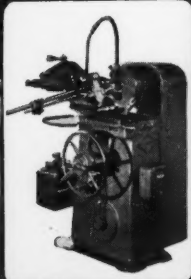
Write for  
Bulletin.



**LINLEY  
BROS. CO.**

15 MONTAUK ST.  
BRIDGEPORT, CONN.

## SELLERS No. 6-G



GRINDS  
DRILLS AS  
SMALL AS 1/16"

## DRILL GRINDER

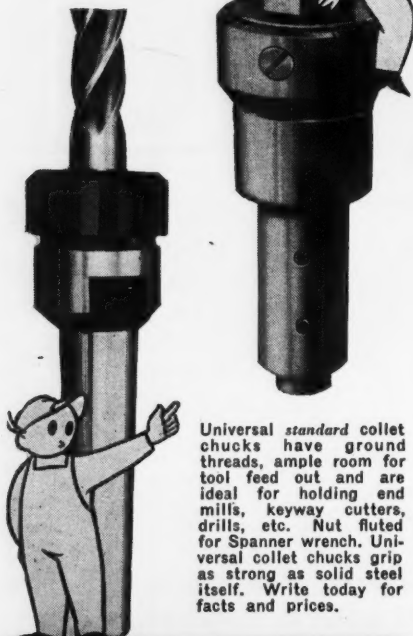
GRINDS  
DRILLS AS  
LARGE AS 3"

WM. SELLERS & CO., INCORPORATED, 1614 Hamilton St., PHILADELPHIA, PA.

# Sellers

## UNIVERSAL COLLET CHUCKS FOR ACCURACY AND SPEED

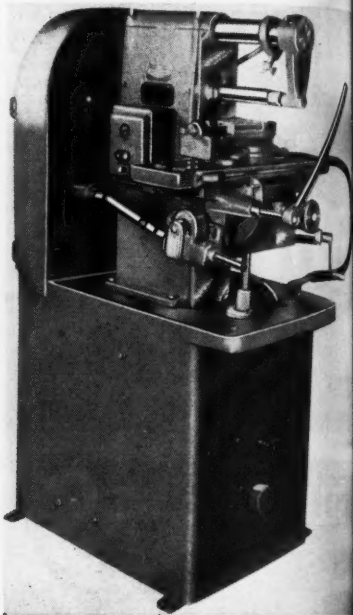
Universal floating collet chucks (right) are designed to operate horizontally in automatic screw machines and turret lathes. Adjustable spring pressure in 4 directions prevent dogtail motion and marred holes.



Universal standard collet chucks have ground threads, ample room for tool feed out and are ideal for holding end mills, keyway cutters, drills, etc. Nut fluted for Spanner wrench. Universal collet chucks grip as strong as solid steel itself. Write today for facts and prices.

**UNIVERSAL**  
Engineering Company  
Frankenmuth, Mich.

Construction features of the machine include rugged cast column mounted welded steel base, which provides housing for V-belt motor drive and built-in 3-gal. coolant reservoir. Cooling system is optional equipment. All sliding members of the machine are scraped to accurate fit, and the spindle and jackshaft are fitted with



Miller & Crowningshield No. 3 Hand and Power Feed Milling Machine

adjustable taper roller bearings, lubricated by oil reservoirs. Twelve spindle speeds are available by means of interchangeable V-grooved pulleys. All belts have independent adjustment from outside the base of the machine.

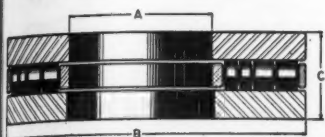
The Miller & Crowningshield No. 3 Hand and Power Feed Milling Machine is supplied complete with  $\frac{1}{2}$  h.p. motor drive having 1,750 r.p.m. motor. Larger motors can also be obtained. For slow speeds, motors providing speeds from 100 to 1,822 r.p.m. are available.

Specifications of the machine are as follows: spindle, No. 10 B & S taper  $\frac{3}{4}$ -inch bore; table,  $6\frac{1}{2}$  x 22 inches over all with  $\frac{5}{8}$ -inch T-slot; vertical range of knee, 9 inches with micrometer dial cross feed,  $3\frac{1}{4}$  inches with micrometer dial; longitudinal movement of table



the machine  
mounted on  
provides  
drive  
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# GWILLIAM



TYPE RT

## ROLLER THRUST BEARINGS

Made with flat seats and in a variety of self-aligning types.

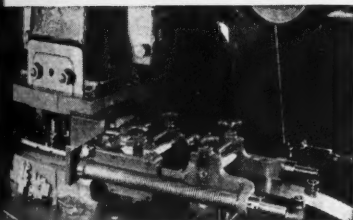
These bearings are especially adapted for heavy loads at slow or moderate speeds.

Standard sizes are shown in our general catalog, sent upon request.

**THE GWILLIAM CO.**

350 FURMAN ST. BROOKLYN, N. Y.

## FOR QUICK SET-UPS ON ANY PUNCH PRESS



The Dickerman Die Feed can be installed on almost any type of punch press, and can be placed on die-set in any position for any style die. Only 3 screws are required to mount feed to die-set. It requires no connection to power shaft of press. Twin operating cam is furnished for attaching to punch holder.

Handles coiled stock of any practical thickness. Maximum stock width, 4". Adjustable from 0 to maximum feed length of 3" in increments of .001". Write for folder No. 82.

**H. E. DICKERMAN MFG. CO.**

321 ALBANY ST. SPRINGFIELD, MASS.

## HEAT-FAG and ACCIDENTS *Ride Together*



AVOID HEAT-FAG--USE

**MORTON'S  
SALT TABLETS**

## Beware of HEAT-FAG!

Salt lost by sweating must be replaced or workers tire quickly—accuracy and alertness are dulled. Lowered efficiency, mistakes and accidents take their toll.

### MORTON'S Salt Tablets

Install Morton's Dispensers by all drinking fountains, so workers can take tablets to replace the salt lost by sweating.

### ORDER NOW!

Salt Tablets,

Case of 9000 - \$2.60

Salt-Dextrose Tablets,

Case of 9000 - \$3.15

### Dispensers

500-tablet size - \$3.25

1000-tablet size - \$4.00



**MORTON SALT CO., Chicago, Ill.**

3 Hand  
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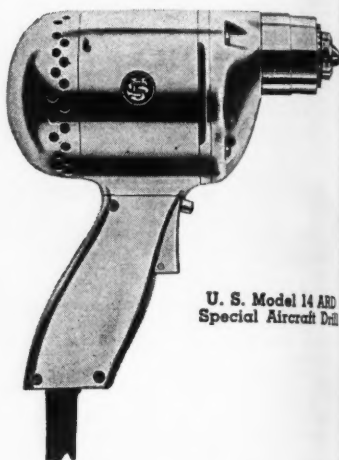
either hand or power feed,  $1\frac{1}{4}$  inches; overhead arm diameter,  $2\frac{1}{8}$  inches; maximum diameter of cutter,  $6\frac{1}{4}$  inches; overall height of machine, 56 inches; floor space required, 18 x 21 inches; net weight, approximately 825 lb.; shipping weight, 825 pounds.

### U. S. Model 14 ARD Special Aircraft Drill

A  $\frac{1}{4}$ -inch heavy duty ball bearing special aircraft drill designated as the Model 14 ARD has been placed on the market by The United States Electrical Tool Co., Cincinnati, Ohio. The drill, as its name denotes, is designed primarily for use in aircraft construction. Outstanding features include streamlined construction and close-coupling, which enable the drill to be operated in close quarters.

The Model 14 ARD has a  $\frac{1}{4}$ -inch three-jaw chuck and is equipped with a universal motor having speeds from 750 to 5,000 r.p.m. Ball bearings of the unit are set in steel retainers with screw plugs to permit easy removal. The switch of the drill has locking pin in center of trigger, thus permitting

drill to be used by right or left-handed operators. The drill is furnished complete with 15-foot three-wire cable

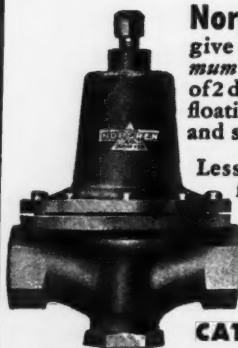


U. S. Model 14 ARD Special Aircraft Drill

ing protector in handle.

The rear cap over the commutator of

## DON'T STARVE YOUR AIR TOOLS



**Norgren Valves** give air tools *maximum* power because of 2 distinct features: floating diaphragm, and siphon tube.

Less pressure drop for full volume, no creep, chatter or fluctuation...decisive operation of tools.

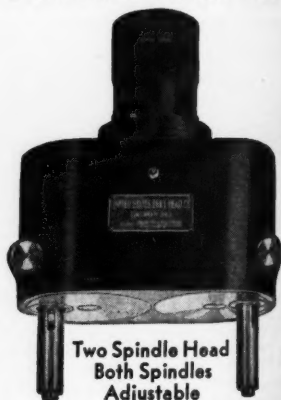
**CATALOG 400**

Available with or without direct-mounted gage.

**C. A. NORGREN CO.**

2nd at Santa Fe—Denver, Colorado

## U. S. HEADS STANDARD SINCE 1915



Two Spindle Head  
Both Spindles  
Adjustable

**The United States Drill Head Co.**

1954 Riverside Drive  
CINCINNATI, OHIO

left-hand  
finished com  
e cable has



del 14 ARD  
Aircraft Drill

mutator of

ADS  
1913

ad Co.

May, 1940 May, 1942

**GRANT**

## RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to  $\frac{1}{2}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles.

Write for literature—and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
96 Stillman Ave. Bridgeport, Conn.

**GET PEAK**

**RESULTS WITH**

**GROB**

**DIE MAKING MACHINERY**

"THE TOOLMAKERS' BEST FRIEND"



Compact, powerfully built, for rigorous shop service. Faster, more economical in operation.

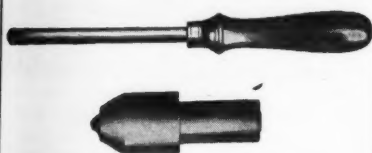
Unmatchable performance for most difficult sawing and filing of tools and dies.

Write or wire for details and prices



**GROB BROTHERS**  
GRAFTON WISCONSIN

## DESMOND DIAMOND TOOLS AND NIBS

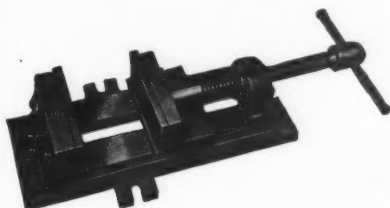


We can supply you with best quality diamonds in any size and type of mounting, also promptly remount your diamonds.

For over 35 years we have supplied leading industrial firms throughout the country. Advise your requirements and let us send you literature and prices.

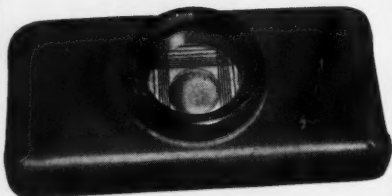
**THE DESMOND-STEPHAN MFG. CO.** -:- **Urbana, Ohio**

## SIMPLEX MILLING MACHINE and DRILL PRESS VISES



We manufacture a complete line of vises, including Machinists', Filers', Welders', Production and Drill Press and Milling Machine. Ask for catalog and name of your nearest dealer.

## "All-Way" LEVEL



The FELL Precision Level is made to show the level of all ways at once. This eliminates disturbing the first level when leveling the second. Graduations are in .0005" per foot and form squares about a circular bubble, thus giving co-ordinate readings and showing direction and amount of slope, if any.

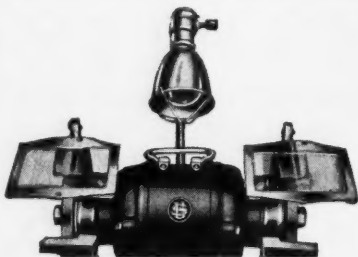
MADE IN TWO SIZES  
5½" x 12"      3½" x 6"

Write for Bulletin

**WM. B. FELL CO.**

702 SOUTH ST.

ROCKFORD, ILL.



## FLEXIBLE LIGHT... Where Most Needed

Get better production per machine... save eye strain... overcome night-time lighting handicaps... by installing VIMCOLIGHT. Gives light at any angle, concentrated, non-glare, low-cost. U.S. Electric Utility Grinders offer this modern equipment. Are YOUR machines Vimcolighted?

Get full details.

**VIMCOLIGHT**

VIMCO MANUFACTURING CO. INC.  
116 CHENANGO ST. BUFFALO, N. Y.

the unit can be easily removed for commutator inspection, replacement, or adjustment, and the commutator is air-cooled to prevent overheating.

## DoAll Supply Cabinet

A cabinet designed for use in storing supplies and attachments for DoAll Contour Machines has been placed on the market by Continental Machine



DoAll Supply Cabinet

Inc., 1306 S. Washington Ave., Minneapolis, Minn. According to the manufacturer, over 8,000 feet of saw in 100-foot coils can be stored according to width, pitch, temper, and set in the 12 bins provided in the cabinet. Ample space for saw bands that are in use is also provided.

Directly above the saw-box bins, a curved shelf forms a support to provide space for 12 file bands. Eight hooks to the left of this support are used for small file bands or file band extensions.

The DoAll parts box furnished with each DoAll machine fits into one of

## Automatic Metal Saw Grinder and Retooler

MODEL IC

**PRECISION  
and  
ACCURACY  
AUTOMATICALLY  
ASSURED**



For metal cutting  
saws 2" to 14" in dia.  
When specified, saws  
as small as 3/4" dia.  
and 1/4" to 2" spac-  
ing. Also supplied as  
a Combination Grind-  
er for circular, band  
and hack saws.

WRITE FOR CIRCULAR

**The Wardwell Mfg. Co.**

1166 Fulton Rd.

Cleveland, Ohio

Accurate, High-Speed

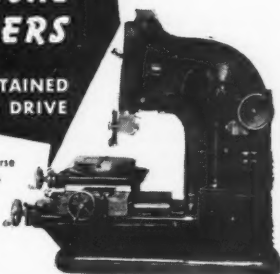
**MOREY  
VERTICAL  
SHAPERS**

SELF-CONTAINED  
MOTOR DRIVE

8" STROKE  
12" STROKE

power rapid transverse  
feeds in all directions

Timken Tapered  
Roller Bearings for  
Main Spindle—all  
others anti-friction.



Built to highest accuracy standards the MOREY VERTICAL SHAPER is simple for tool-room manufacturing. Power feeds and power rapid transverse feeds in all directions are instantly available in all operating positions.

Ask for Circular 726

**MOREY MACHINERY CO., INC.**

410 Broome Street

New York, N. Y.

## Lower Prices—Prompt Delivery

You save four ways when you order  
Willey's General Purpose Tools:

1. Lower prices, just announced.
2. Increased production.
3. Lower operating costs.
4. Prompt delivery saves down time.

Tipped with Willey's Metal, these tools  
are suitable for machining cast-iron,  
tough hard rubber, bakelite, fibre, and  
tough alloy steels.

Standard tools, in many cases, will  
handle 90% of your requirements.  
Special tools quoted on request.

Write for BULLETIN 142

Quotes new prices on all grades, sizes  
and classifications of Willey's standard  
tungsten carbide cutting tools and  
blanks.

**WILLEY'S**



300 SERIES  
GENERAL PURPOSE  
CUTTING TOOLS

**WILLEY'S CARBIDE TOOL CO.**

1340 W. Vernor Highway.

Detroit, Michigan

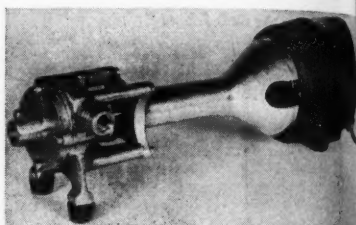
three shelves in the cabinet. The remaining shelves are said to be ideal for the safe storing of attachments which cannot be hung on the door brackets. Eleven brackets for holding saw guides, file guides, wrenches, filler plates, and so on, are located on the doors of the cabinet. A replaceable, illustrated inventory pad is also provided on the left-hand door of the unit.

All shelves and partitions are screw fastened so that adjustments in sizes can be made to suit special requirements. The doors are equipped with a three-way lock, which affords ample protection against theft of supplies and provides added strength in supporting cabinet in transit. The cabinet measures  $16\frac{1}{2}$  x  $30\frac{1}{4}$  x  $79\frac{3}{8}$  inches and is finished in No. 7B machine tool grey.

### Eastern Model EH Hot Liquid Pump

Designated as the Model EH, a centrifugal type hot liquid pump of compact construction has been introduced by the Eastern Engineering Co., 40 Fox St., New Haven, Conn. The pump is designed for use in industrial and pilot

plants, laboratory and experimental applications where thin liquids at temperatures up to 500 deg. F. are to be handled.

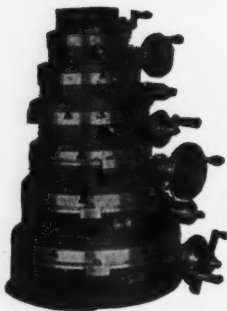


Eastern Model EH Hot Liquid Pump

The Model EH pump is 12 inches long, 4 inches wide, and  $4\frac{1}{4}$  inches high and weighs 7 lb. The unit is powered by means of a  $1/20$  h.p. universal fan-cooled motor designed for use on 115 volt alternating or direct current.

The stuffing box of the pump is accurately adjustable by means of an easily accessible adjustment ring. The motor and pumping unit are coupled through

### Troyke Rotary Tables



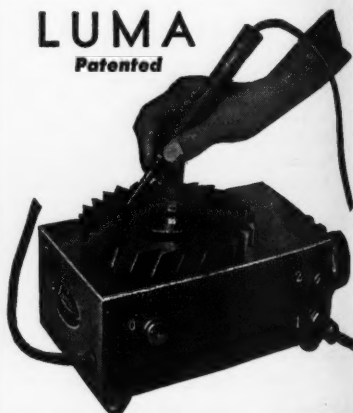
Sizes 9", 12", 15", 18", 21", 25"

Ask your dealer or write us for eight page catalog.

**ALFRED A. TROYKE**

4422 Appleton St. Cincinnati, Ohio

### LUMA Patented

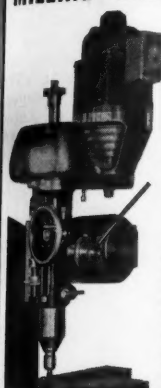


Combination Demagnetizer and Electric Etching Pencil. Marks symbols in hardest steel. Demagnetizes instantly. One of our models popular in tool rooms for 15 years.

Luma Electric Equipment Co.  
DEPT. MS TOLEDO, OHIO



## MILLING - DRILLING - BORING ATTACHMENT for Heavy Duty Operations



Uses many types of cutters on a wide range of work. 1/16" to 3/4" end mills.

### FEATURES

Large size spindle with No. 9 B & S Taper. Large quill diameter with a travel of 4". Furnished with 1/4 h.p. motor.

The aluminum pulleys provide a range of six speeds, from 250 to 3000 R. P. M. The spindle takes 1/16" to 3/4" end mills. Quill is counterbalanced and hardened and ground. Overarm brackets equipped with spreader screw for easy mounting.

Send for Descriptive Folder.

## RUSNOK TOOL WORKS

1845 W. Carroll Ave.

Chicago, Ill.

## OtC PULLING SYSTEM

*The*  
**EASY  
QUICK  
SAFE WAY**

—to remove and install pulleys, shafts, wheels, gears, bearings, and other machine parts . . . .

### OtC GRIPOMATIC PULLERS

with patented automatic non-slipping grip—and OtC Heavy Duty Push-Pullers—designed to facilitate working in close quarters, avoid damage to costly parts, speed machine repair and maintenance, reduce accidents, conserve time and man power.

SPECIAL TOOLS made if needed.

Write for Plant Maintenance Bulletin No. PE-1520.

## OWATONNA TOOL CO.

357 CEDAR STREET  
OWATONNA, MINNESOTA

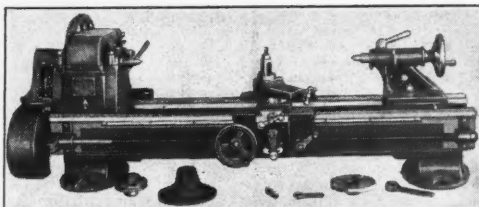
CAPACITIES: 5 TO 50 TONS



## The Improved "AMERICAN INDUSTRIAL" 12" Back-Geared SCREW-CUTTING LATHE

### THREAD RANGE

—4 to 104 English Measure or (Optional) 4 to 52 English, 1/4 to 4 1/2 Mm. Metric.  
48" Bed.



**Automatic  
Cross  
Feed**

**Automatic  
Longitudinal  
Feed**

## AMERICAN MACHINE & TOOL CO. of Pennsylvania, Inc., ROYERSFORD, PA.

Sole Export Distributors: SABIN ST. GERMAIN & ASSOCIATES, 21 West St., New York, N. Y.

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BOSTON . . . . . 161 Columbus Ave.  
CHICAGO . . . . . 819 W. Congress St.  
CINCINNATI . . . . . 125 W. Third St.  
CLEVELAND . . . . . 1108 W. 9th St.  
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KANSAS CITY . . . . . 1322 McGee St.

LOS ANGELES . . . . . 311 San Pedro St.  
MILWAUKEE . . . . . 1034 N. Edison St.  
MINNEAPOLIS . . . . . 515 4th Ave.  
NEW ORLEANS . . . . . 737 Tchaupt St.  
NEW YORK . . . . . 37 Walker St.  
PHILADELPHIA . . . . . 1024 Race St.  
RICHMOND, VA. . . . . 511 E. Cary St.  
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**PROMPT DELIVERY—**  
**PRECISION GROUND**  
**THREAD PLUG & RING GAUGES**

American Nat'l Coarse Threads  
 American Nat'l Fine Threads  
 American Nat'l Special Threads  
 In Accordance to A.G.D.

Single End—Double End Plugs  
 —Combination of a thread  
 plug and plain core plug for  
 minor diameters.

Split Adjustable or Solid  
 Ring Gauges.

Sizes of  
 plugs up to  
 10" dia.

Sizes of  
 rings  
 from 1/8"  
 to 8" I.D.

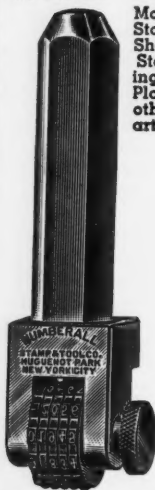


**ALLEN GAUGE & TOOL COMPANY**

421 N. Braddock Ave. (21), Dept. C, Pittsburgh, Pa.

**Mark It Quickly**  
**with a NUMBERALL**

Made with 1 to 10 wheels.  
 Stamp in perfect alignment.  
 Shank for Hand or Press  
 Stamping. Platform for stamp-  
 ing Name Plates and  
 other small  
 articles.



**NEW Quick Set Ma-**  
**chine.** One wheel can  
 be turned quickly by  
 knurled knob for con-  
 secutive numbering.

**NUMBERALL STAMP**  
**& TOOL CO.**

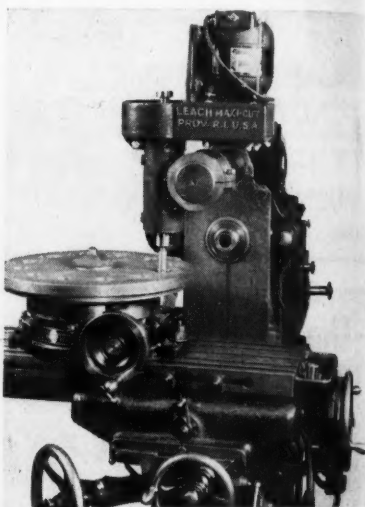
Huguenot Park,  
 Staten Island, N. Y.

a 5-inch heat radiating tube contain-  
 ing a shaft supported by outboard ball  
 bearings.

The Eastern Model EH Hot Liquid  
 Pump has a maximum pressure of 22  
 lb. per square inch and maximum vol-  
 ume of 7 3/4 gallons per minute. The  
 pump is manufactured in stainless  
 steel, Monel metal, chromium plated  
 bronze, Hastelloy "C," and other alloys.

**"Maxi-Cut" Milling Head**

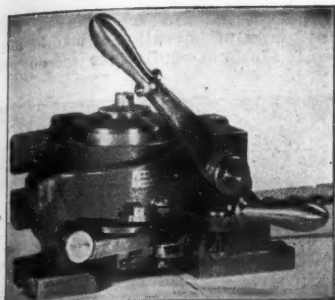
Known as the "Maxi-Cut," a milling  
 head of simple and rigid design for use  
 in performing all types of milling, drill-



**"Maxi-Cut" Milling Head Applied to Horizontal  
 Milling Machine**

ing, boring, and facing operations in  
 the making of tools, dies, jigs, fixtures,  
 and patterns is now being marketed by  
 the H. Leach Machinery Co., 387 Charles  
 St., Providence, R. I. The head weighs  
 approximately 75 lb. and is designed  
 for clamping on a horizontal milling  
 machine equipped with a 3 1/2-inch bar.

The spindle is arranged for draw col-  
 lets having a capacity for single or  
 double end mills up to 3/4 inch, and is  
 provided with speeds of 500, 1,050, 1,725  
 and 2,900 r.p.m. The spindle is mounted  
 in double sealed, greased-for-life ball  
 bearings of ample size to ensure accu-  
 rate and trouble-free service. The mo-



## DEARBORN Automatic Chucking and Indexing Fixture

### MILLS OVER 1000 PARTS PER HOUR

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The Maxi-Cut Milling Head is supplied complete with collet, box wrench, drawbar, and two draw pins.

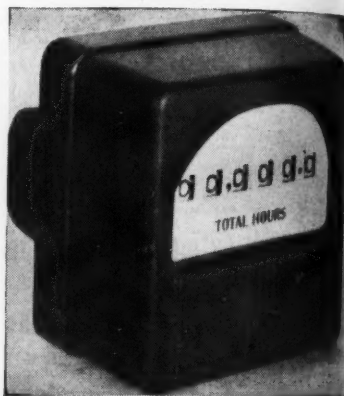
### Westinghouse Elapsed Time Meter

To check production and machine tool life in industrial plants where time studies are made, a meter designed to indicate elapsed time in minutes or hours is announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Using six counter units, the meter consists essentially of a synchronous driving motor, gear train, and six numbered wheels.

The motor operates at 600 r.p.m. on a 115 volt, 60 cycle circuit. According to the manufacturer, synchronous operation is not affected by voltage variations of from 75 to 125 per cent of rated value. Lifetime meter bearing lubrication is provided by an oil storage reservoir, and gears are precision machine cut and gold plated to resist corrosion.

To operate, the meter is connected in

parallel with the machine of which total hours of operation are to be measured. Meter circuits are closed when



Westinghouse Elapsed Time Meter

the machine operates, thereby causing the synchronous motor to run continuously. Resetting of meter to zero or



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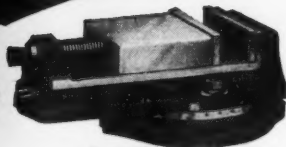
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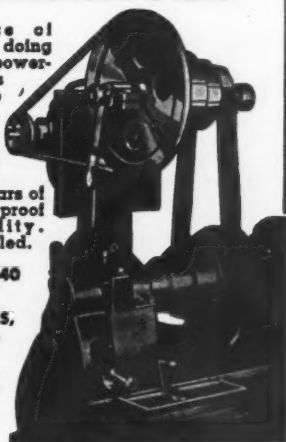
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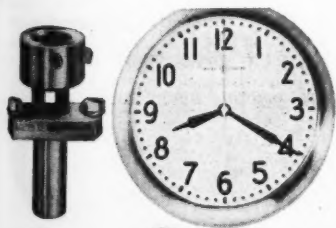
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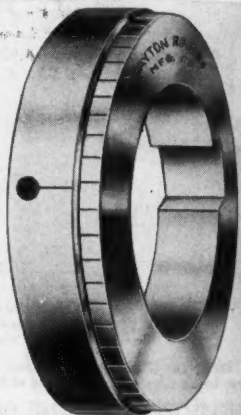
any value is accomplished by removing the case and disengaging the number wheel shaft. The wheels can then be set to any desired reading.

### Dayton Rogers Adjustable Spacing Collars

The Dayton Rogers Mfg. Co., 2830 S. 13th Ave., Minneapolis, Minn., is now producing precision adjustable spacing collars which are said to be well adapted to all gang milling setups. The collars

are so constructed that they can be used to advantage in accurately spacing all straddle milling, gang milling and multiple slotting milling machine setups.

The Dayton Rogers Adjustable Spacing Collars have a maximum adjust-



Dayton Rogers Adjustable Spacing Collar

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ment of  $\frac{1}{16}$  inch and are graduated in thousandths of an inch. However, a 0.00025-inch adjustment can be easily obtained, thus assuring accurate precision spacing of milling machine cutters at all times. The collars are made in 11 sizes for cutter arbors from  $\frac{1}{8}$  to 3 inches.

### Micro Super-X Honing Stone

Illustrated herewith is the Micro Super-X honing stone which has been

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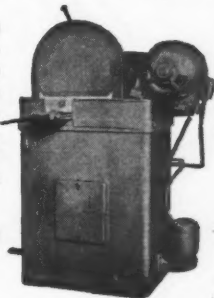
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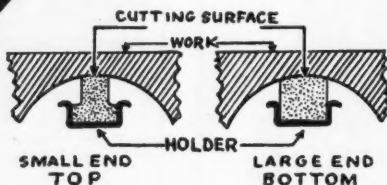
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May, 1942

MODERN MACHINE SHOP 305

developed by the Mid-West Abrasive Company, 2189 Beaufault Ave., Detroit, Mich., and which was announced in the

holes provide no over-hang for the stone at the lower end of its traverse movement, thus subjecting the upper area of



(Left) Drawing Illustrating Design of Micro Super-X Honing Stone. (Right) Drawing Showing Amount of Taper Bottom Ends of Micro Super-X Honing Stone

March, 1942, issue of MODERN MACHINE SHOP. The feature of this stone is that it produces an unusually straight, true hole in actual production. The taper problem in honing blind holes is created by the fact that the

bottom of the hole. Under such circumstances tapered walls are certain to develop.

To meet this problem, Mid-West engineers have developed a stone with a tapered working surface designed so

the wall to considerable more cutting action than possible at the bottom end. In other words, the entire working surface of the stone contacts the entire area of the work in the upper portion, whereas the abrasive contact in the lower area is limited to that portion of the working surface in contact with the work up to the moment the lower end of the stone reaches the

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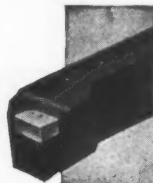
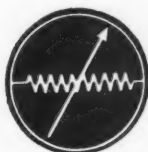
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May, 1942

MODERN MACHINE SHOP 307

that the additional surface contact at one end will exactly compensate and counter-balance the abrasive action at the other. To achieve the objective; i.e., to produce a stone that would minimize or completely eliminate tapered side-walls requires a delicate dimensional balance between the working surfaces at the ends of the stones.

Because of its tapered working surface, the new stone is said to be manufactured with an unusual amount of tensile strength. It is claimed that this unusual strength is obtained through a bonding compound which has been de-

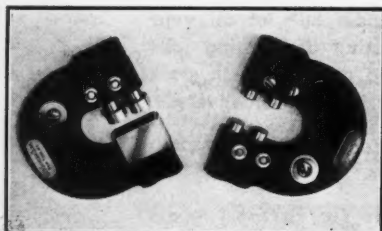
veloped and patented by the company. Stones made with this bond, it is claimed, will not break or chip along the edges when subjected to high pressure.

The honing operation, when the new stones are used, does not vary from that of conventionally designed stones.

## Industrial Time Totalizer

Where an exact record of machine hours is required, the Industrial Time Totalizer shown herewith, product of the Industrial Timer Corp., 117 Edison Place, Newark, N. J., is said to provide

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Many plants engaged in war work are using Adjustable Limit Snap Gages. Our ATLANTIC gages are made of MEEHANITE castings for stability and rigidity. WRITE TODAY FOR FOLDER. PROMPT DELIVERIES TO PLANTS FURNISHING PREFERENCE RATINGS.

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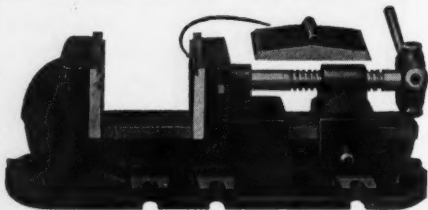


## Industrial Time Totalizer

absolute accuracy. According to the manufacturer, production costs of any a.c.-operated machine can readily be computed from the visible hours and minutes shown on the totalizer dial. In addition, equipment of predetermined limited life expectancy can, it is claimed, be replaced before failure when the totalizer is used to check the hours in use.

Housed in Bakelite, the Industrial Time Totalizer is designed to harmon-

## GEM DRILL PRESS AND MACHINE VISES...



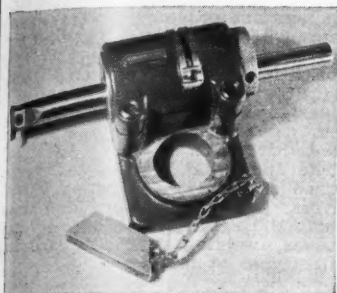
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The Everede Boring Bar Holders are adjustable to fit various size lathes. (Bushings are furnished with each boring bar for use in the Holders.) Everede Holders keep the boring bar in a horizontal position, regardless of any change in the size of the lathe, within limits. • The No. 1 Holder for lathes from 7" swing to 9". • The No. 2 Holder for lathes from 8" swing to 12", and the No. 3 Holder on engine lathes from 12" swing to 24".

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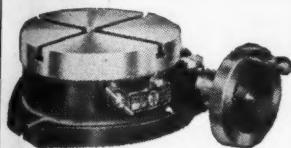
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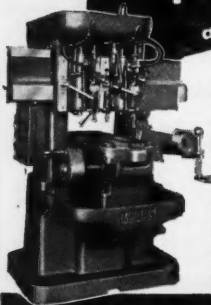
1942

May, 1942

MODERN MACHINE SHOP 309

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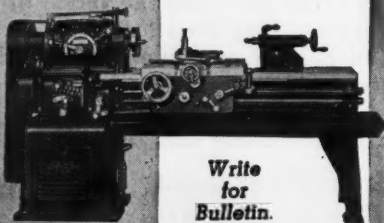
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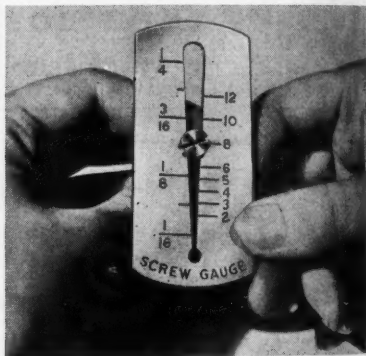
ATAMIA OHIO U.S.A.

ize with other instruments installed on a panel. Combination screw and soldering lugs are provided for easy installation. The totalizer is operated by a long life synchronous heavy duty self-lubricating motor connected through gears to a five-digit-hour counter, which is designed to record up to 10,000 hours. The right-hand (red) digit indicates one-tenth hours.

The Industrial Time Totalizer is designed for use in connection with conveyors, Diesel generators, drill presses, molding machines, oil burners, punch presses, welding machines, and many other types of machines.

## American National Standard Screw Gage

The Dayton Rogers Mfg. Co., 2830 S. 13th Ave., Minneapolis, Minn., is now offering for free distribution the handy



American National Standard Screw Gage

American National Standard Screw Gage shown here for calibrating both wood and machine screws in sizes from No. 1 to No. 12 inclusive.

This recording caliper gage has two sets of graduations. The one on the left of the angular slot instantly records the number or size of wood and machine screws, while the graduations on the right instantly record the diameter size of various round stock from  $\frac{1}{8}$  to  $\frac{1}{2}$  inch. Although the gage is graduated in sixteenths of an inch, a  $\frac{1}{4}$ -inch graduation can be very easily estimated.

The American National Standard Screw Gage is accurately made from 0.165-inch thick high quality flat steel.

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WITH the THERMOID  
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For  
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May, 1942

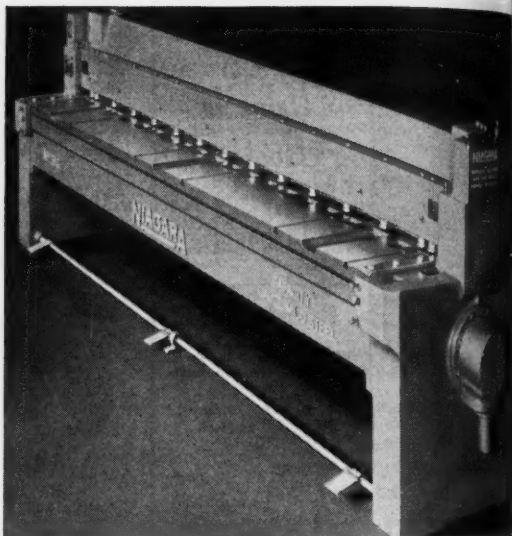
MODERN MACHINE SHOP 311

**Niagara Series No. 3 Power Squaring Shear**

carefully die-cut to size and so finished as to prevent rusting. The gage is approximately 3 inches long x 1 1/2 inches wide overall, and is available free of charge upon receipt of a request addressed on a company letterhead.

**Niagara Series No. 3 Power Squaring Shear**

A line of power squaring shears designated as the Series No. 3 is announced by the Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y. The Series No. 3 shear is available in capacities of 14 to 18 gauge and



cutting lengths of 4 to 12 feet. By means of the machine, edges can be sheared that are straight and parallel to within

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Exclusive replaceable blade feature  
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It's easier to use, too. Gets both inside and outside  
measurements between hook on blade end and edges of  
metal case. Lever lock holds reading while you bring  
rule to eye. You read direct from tape at marks on  
case—with .003" accuracy—no adding, subtracting or  
remembering. Permanently etched graduations both  
edges, both sides of blade—tenths and hundredths one  
side if desired.

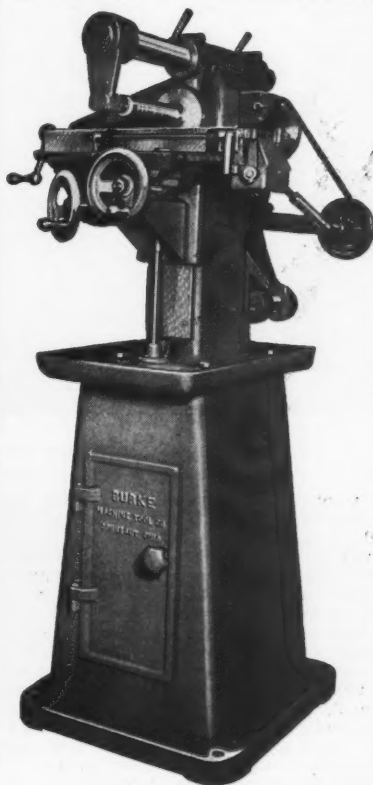
To do better work faster, more easily, at lower long-run  
cost, get Master "Streamline" now. At hardware and  
mill supply houses or order direct from Master Rule  
Mfg. Co., Inc., Dept. D-5, 815 E. 136th  
St., New York.

\$2.65  
Complete  
with Spare  
Blade

## MASTER WOOD AND TAPE RULES

2345

# BURKE MILLING MACHINES

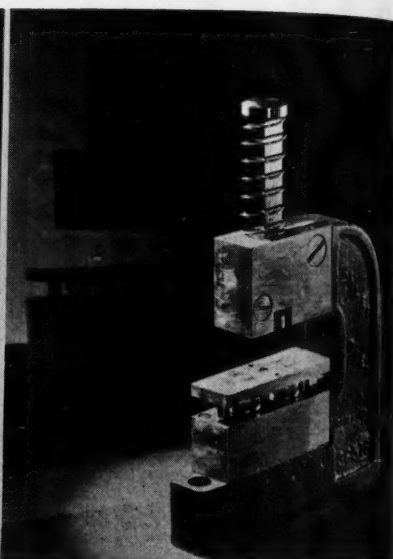
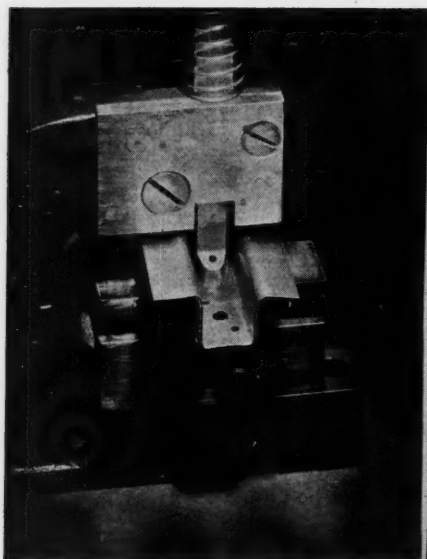


**No. 4 Motor Driven MILLING MACHINE  
Mounted on Cabinet Column**

Burke motor driven milling ma-  
chines Nos. 1, 2, 3, and 4 are  
specially suited for handling  
small, difficult work on a pro-  
duction basis.

Write for complete information.

**BURKE MACHINE TOOL CO.**  
297 E. 16th St.      Connecticut, Ohio



Wales Punch and Die Holder

a very few thousandths of an inch.

The Series No. 3 shear has an operating speed of 80 strokes per minute. High production squaring and trimming are said to be assured by an instant-acting sleeve clutch and quick-acting, ball bearing, self-measuring back gage. Additional features include convenient operation and reduction of fatigue in handling sheets and off-cut material.

The driving mechanism, including fly-wheel, gearing, clutch, eccentrics, and connections, is enclosed and operates in oil, thus assuring long life, low maintenance cost, and utmost safety. The motor is direct connected.

### Wales Punch and Die Holder

A self-contained punch and die holder designed to punch in one operation a series of three holes for use in riveting small parts to channeled or flat material has been added to the Wales line of punching and notching equipment marketed by The Strippit Corp., 1200 Niagara St., Buffalo, N. Y. With the holder, the series of three holes can be punched in a straight line or at any angle, according to the setup of the holder on rail or T-slotted plate.

According to the manufacturer, the Wales Punch and Die Holder has noth-

## ANDERSON HAND SCRAPER and BLADES



One blade is equal to an ordinary hand scraper reformed about 5 times. When it is worn out a new blade makes a new scraper. Blades need stoning but no grinding. Blades are

$\frac{1}{8}$ " thick from end to end and of correct hardness. Three sizes:  $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ".

Try these fast, cost-cutting tools.

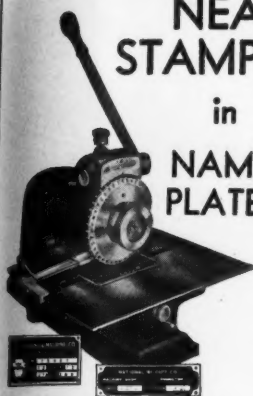
Write for complete details.

**ANDERSON BROS. MFG. CO.**

1926 KISHWAUKEE STREET  
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## NEAT STAMPING

in  
NAME  
PLATES



*Nameplate Detail Press*

This machine quickly stamps details and serial numbers into name plates.

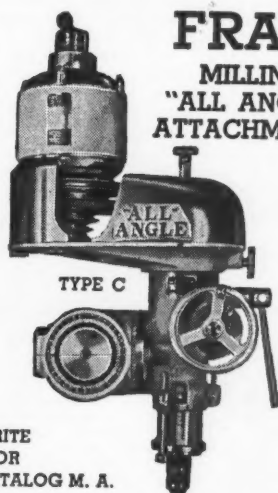
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**GEO. T. SCHMIDT, Inc.**

1806 Belle Plaine Ave. Chicago, Ill.

## FRAY

MILLING  
"ALL ANGLE"  
ATTACHMENTS



TYPE C

WRITE  
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**FRAY MACHINE TOOL CO.**

503 W. WINDSOR

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*There is no substitute for*



*Rawhide*



... and the hide of the Java Water Buffalo such as is used in Chicago Rawhide Hammers and Mallets is the toughest and the most enduring of all. These fine tools in sizes from 2 ounces to 6 pounds are not only long-lasting but are made to strike thousands of blows accurately and safely without damaging surfaces or materials from delicate wire insulation to heavy duty yet precision made crankshafts. At your dealers.

**CHICAGO Rawhide MFG. CO.**

1281 ELSTON AVE..



CHICAGO, ILLINOIS.

ing to be attached to the ram of the punch press. By having the punch and die built into the same holder, constant alignment is said to be assured for the life of the holder. In using the holder, all that is necessary is to lock the holder in position on rail or T-slotted plate and start punching. No further adjustments are required.

## Ames No. 22 Dial Test Indicator

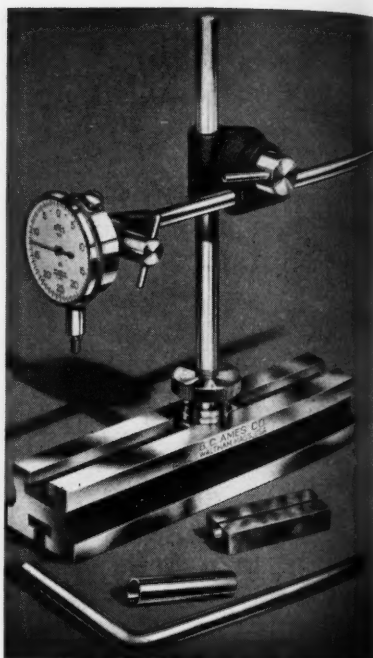
Designed for use by machinists, tool-makers, inspectors, scrapers, and as-

### DRILL and PILOT BUSHINGS Frictionless —Rotary

For core drilling, T. C. and high speed boring, turret tool piloting, etc. Won't stick or clog. Dust proof as a watch.

Write for details.

**GIERN & ANHOLTT TOOL CO.**  
1312 Mt. Elliott Ave. Detroit, Mich.



Ames No. 22 Dial Test Indicator

## Gear Specialties

With considerable experience and exceptional facilities for the manufacture of high precision Small Gears, our manufacturing capacity is now heavily burdened with National Defense work, and we naturally feel pardonable pride in the importance and quality of our contributions to the Program.

While this very essential work takes precedence, we are keenly conscious of our duty to established customers; their needs must command our continued earnest efforts. Under such circumstances, we hope new inquirers will understand our inability to give their wants the consideration they would ordinarily receive.

## Gear Specialties

MANUFACTURERS  
CHICAGO

semblers, a dial test indicator for determining the flatness of surfaces, roundness and trueness of revolving parts, relative heights and thicknesses, and so on, has been placed on the market by the B. C. Ames Co., 141 Lexington St., Waltham, Mass. The indicator, which is designated as the No. 22, can be adjusted to any position and is well proportioned for easy handling.

The base, which is made of cast iron,

## "ALNOR" PYROMETERS

for every requirement.

Inexpensive, accurate, durable.

Write for catalog.

Illinois  
Testing Laboratories, Inc.  
153 W. Hubbard St., Chicago





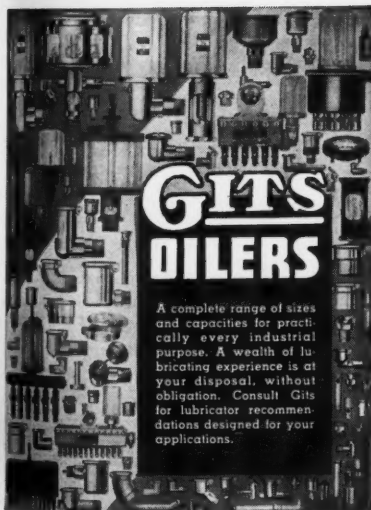
## AMES *Hundred Series* DIAL INDICATORS



Many Types and Sizes  
for Measuring in Thou-  
sandths and Tenths of  
Thousandths Inches.

**B. C. AMES CO.**

141 LEXINGTON ST., WALTHAM, MASS.



## GITS OILERS

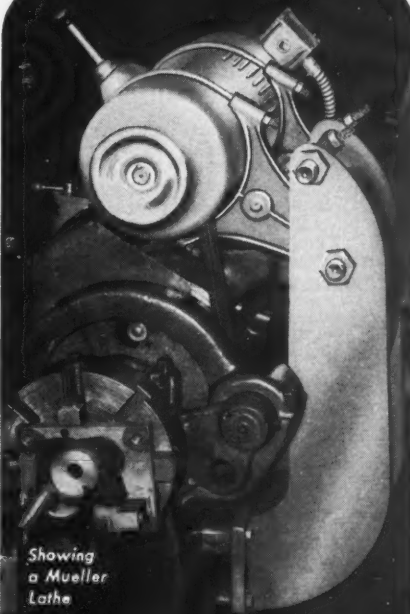
A complete range of sizes  
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cally every industrial  
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your disposal, without  
obligation. Consult Gits  
for lubricator recommen-  
dations designed for your  
applications.

**GITS BROS. MFG. CO.**

*30 years of oil cup experience*  
1846 S. Kilbourne Ave. Chicago, Illinois

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...THE KING  
OF MOTOR DRIVES!



Showing  
a Mueller  
Lathe

ALL HELICAL GEARED, UNSUR-  
PASSED IN POWER, EFFICIENCY,  
SAFETY AND COMPACTNESS

Write for Complete Detailed Specifications

**WESTLOF TOOL  
& DIE COMPANY**

4190 BELLEVUE AVE.  
DETROIT, MICHIGAN

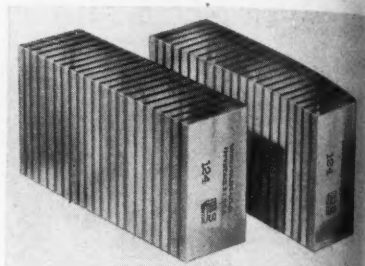
is  $8\frac{1}{2}$  inches long x  $2\frac{1}{4}$  inches wide and is accurately ground top and bottom. The upright rod is  $\frac{3}{8}$  inch in diameter and is held in the top T-slot of the base by an easy turning knurled nut. The horizontal indicator holding rod is  $\frac{3}{8}$  inch in diameter and 9 inches long. The rod is adjustable to any position and is held firmly in place by a lever style clamp.

The indicator proper is an Ames No. 203 with  $\frac{1}{4}$ -inch spindle travel. The indicator is graduated in thousandths and half-thousandths and numbered 0-25-0. Any indicator having a clamping lug on back with  $\frac{1}{4}$ -inch diameter hole can also be used.

### Brown & Sharpe No. 124 Magnetic Chuck Parallels

Magnetic chuck parallels for holding small work and work with projecting surfaces which cannot be readily held on the working surface of magnetic chucks have been announced by the Brown & Sharpe Mfg. Co., Providence, R. I. The parallels, which are designated as No. 124, can be used on chucks of the permanent magnet type and also

on chucks of the electromagnetic type. The parallels are made of alternating steel and non-magnetic bronze strips.



Brown & Sharpe No. 124 Magnetic Chuck Parallels

ing strips. The magnetic flux from the chuck is conducted through the steel strips and work, thereby holding the work firmly to the parallels and the parallels to the working surface of the magnetic chuck. The parallels are  $3\frac{1}{2}$  inches long,  $\frac{1}{8}$  inch wide,  $1\frac{1}{2}$  inches high, and are available only in numbered, matched pairs.

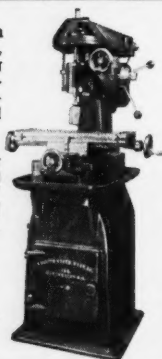
### Vertical Mill and Jig Borer

A simplified, precision tool for milling, boring, facing and routing small parts for instruments, arms and munitions in tool, die and machine shops.

Spindle dia. at driving end,  $\frac{1}{2}$ " 1150 and 1750 r.p.m., 5 speeds. 12" longitudinal travel of table, 7" cross travel. 4" spindle feed.

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A G & S Representative in all principal cities.



**Granite State Machine Co., Inc.**

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Exclusive Selling Agents

**H. Leach Machinery Co.**

387 Charles St.

Providence, R. I.

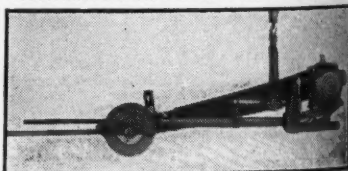


### For Machine and Tool Work and Quick Set-Ups

The only 3-way reading precision indicator. Accurate in either direction. Feeler mounted in centered cone bearings. .014 reading. Price \$5.00 Plus Postage. Write for folder.

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45 E. Stroop Rd. Dayton, Ohio

### MUMMERT-DIXON SWING FRAME GRINDERS



Sizes 12", 14", 16", 18", 20" and 24" wheels.  
ASK FOR DESCRIPTIVE CIRCULAR

**MUMMERT-DIXON CO.**  
120 Philadelphia St. Hanover, Pa.

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C. O.  
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, 1942



**CIRCULAR SAWS**

Made in high speed steel — 1/4" to 10" diameter.  
Also special saws.  
Write for catalog.

TRADE MARK

**CIRCULAR TOOL CO., Inc.**  
767 ALLENS AVENUE • PROVIDENCE, R. I.

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**SPEED YOUR PRODUCTION**  
with  
*Walton*  
**TAP EXTRACTORS**



Walton alloy steel "fingers," which fit the flutes of the tap, grip and back out the broken piece quickly, easily and without damage to threads.  
**30 DAY TRIAL OFFER**  
Stock sizes from No. 4 machine screws to 1 1/2" in 2, 3 or 4-flute types.  
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**The WALTON Co.**  
98 ALLYN ST.  
HARTFORD • CONN.



***Bokum Boring Tools***  
***always retain their***  
***free cutting action***

The angle of the cutting edge and the special helical backed-off form of the front of the tool (A and B) produce a free-cutting action that is constantly retained — even through resharpening.

The greatest cutting force is always directed towards the largest cross section of the cutting tool, consequently, the tool can stand much more feed than can the ordinary boring tools. In spite of the increased feed, the tool will not shatter, because the material removed is not taken squarely at right-angles but a favorable slant that produces a smooth bore, true to size.



For speed, economy, accuracy, and efficiency, you'll use Bokum Boring and Internal Threading Precision Tools.

**Send for Catalog No. E-1139.**  
**Available also Carbide Tipped.**  
**Ask for Catalog No. E-398.**

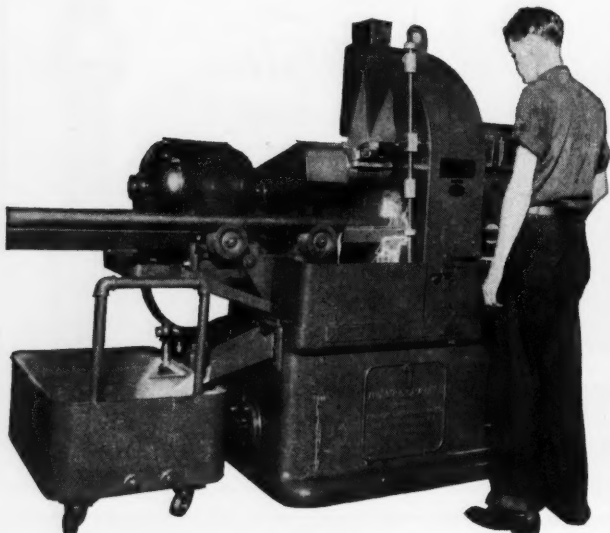
**BOKUM TOOL CO.** 49 W. HANCOCK AVE.  
DETROIT, MICH.

## Campbell No. 425 Cutorialator

The Campbell No. 425 Cutorialator, a wet abrasive cutting machine specially designed for fast, high quality cuts on

draulically-operated work clamps and V-type work holders firmly hold the work being cut. A micrometer work stop assures rapid setup.

The Campbell No. 425 Cutorialator is fully equipped with hydraulic stop remover, work clamps, and wheel feed. An outstanding feature of the machine is a completely separate coolant tank mounted on casters. The coolant pump removes the water from this separate coolant tank and feeds it through a handy shut-off valve to the coolant distributor in any quantity desired. The coolant is forced by the wheel into the cut and returns through the guard to the bed of the machine. It then flows along the bed of the machine into the coolant tank. This arrangement makes the machine easy to clean.



Campbell No. 425 Cutorialator

practically all types of materials up to 3½-inch diameter solid stock and 4½-inch diameter tubing, is announced by the Andrew C. Campbell Division of the American Chain & Cable Co., Inc., Bridgeport, Connecticut.

The Cutorialator is an oscillating type machine effecting a short arc of contact through a combination oscillating and rotating movement of the hydraulically fed abrasive cutting wheel. Hy-

## Diglycol Stearate S

According to an announcement made by the Glyco Products Co., Inc., 220 King St., Brooklyn, N. Y., nickel alloys can now be drawn, stamped, or formed and then annealed without cleaning by using a dispersion of Diglycol Stearate S in water. Diglycol Stearate S is a white, wax-like solid which is dispersible in water and has a melting

## Micra Supreme IMPROVED LAY-OUT DYE

for TOOL,  
DIE, PATTERN,  
OR TEMPLATE  
LAYOUT ON METAL

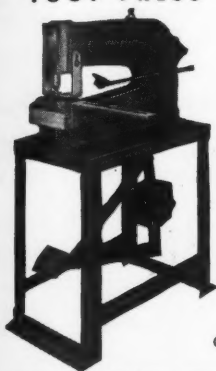
for SHARPLY DEFINED  
SCRIBED LINES



THIS HANDY  
BRUSH-IN-CAP TRIAL CAN  
SENT POSTPAID FOR ONLY 75¢

MICHIGAN CHROME & CHEMICAL COMPANY  
6350 East Jefferson Avenue • • • Detroit, Michigan

## WHITNEY-JENSEN No. 58 TOGGLE ACTION FOOT PRESS

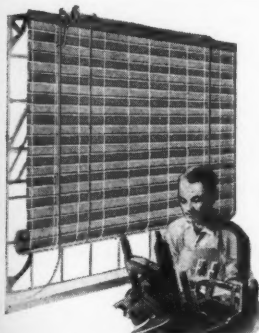


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for  
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### POWERFUL - ACCURATE - DURABLE

This is not the ordinary Foot Press, but a toggle action; no kick or violent force necessary; only foot pressure to create a  $3\frac{1}{2}$  ton pressure per square inch.

**WHITNEY METAL TOOL CO.**  
ROCKFORD, 110 Forbes St. ILLINOIS



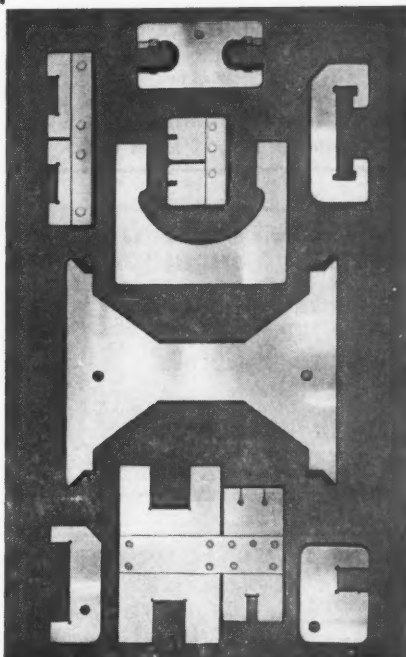
For increased production your employees need protection from SUN-GLARE. Let us make a survey of your shading requirements... at no cost or obligation... The sun heat and glare during the summer months, rob your workmen of that extra effort needed for war production.

**RA-TOX** INDUSTRIAL SHADES  
VENETIAN BLINDS  
BLACKOUT SHADES

**ROUGH SHADE CORPORATION**

JAMESVILLE 1061 Jackson St. WISCONSIN

## SNAP GAGES



**Made To Your Specifications.**

We also make special plug gages to your specifications.

We have no catalog, nor do we carry standard sizes.

**R. KRASBERG & SONS  
MFG. CO.**

925 Wrightwood Ave.  
Chicago Illinois

## OPTICAL COMPARATORS

## MILLING MACHINES

## ROTARY SURFACE GRINDERS

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### PORTMAN MACHINE TOOL CO.

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### The BARNES Motor Driven Precision CUTTER GRINDING MACHINE

For Precision Grinding of  
Formed Milling Cutters used  
in the manufacture of rifles,  
pistols, etc.



**GENERAL MACHINERY CORP.**  
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### MODEL No. 16 "SPECIAL"

Constructed as per Specifications of  
U. S. Naval Aircraft Factories

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**Beware of Imitations!**  
Our machine carries the  
Butterfly trade mark.

### BUTTERFLY FILING and SAWING MACHINE

(Die Making Machine)

This is a very heavy,  
powerful machine and  
is designed for extra  
heavy filing and saw-  
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small work just as well.  
This type of machine  
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Ammunition Plants, Airplane Factories and  
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facture smaller models—Model D—10" Table;  
Model No. E.L.—12" Table.

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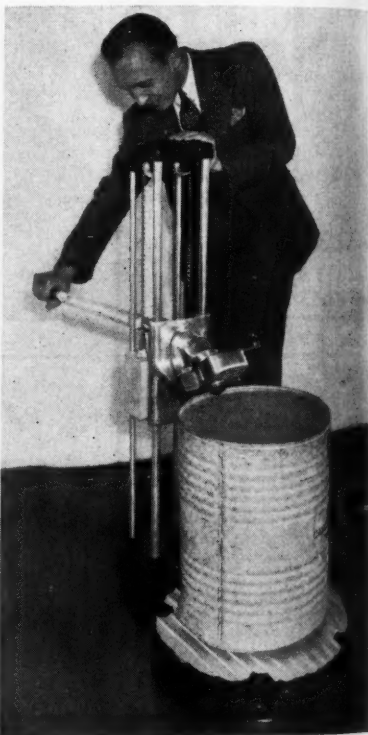
163 Grand St., New York  
Phone: CAnal 6-5170

point of 51 to 54 deg. C. It will fire off  
completely at any annealing tempera-  
ture (400 deg. F. minimum) in an at-  
mosphere of oxygen or hydrogen.

For drawing and stamping, usually a  
1 per cent concentration sprayed is suf-  
ficient as a lubricant.

### Westco Drum Opener

A semi-automatic drum opener of  
simple construction, to be known as the  
Westco, is announced by The Turner &



Westco Drum Opener

Seymour Mfg. Co., Lawton St., Torrington,  
Conn. Easily and quickly oper-  
ated, the unit is designed to eliminate  
injuries associated with the usual ham-  
mer and cold chisel method of opening  
drums.

The Westco Drum Opener is designed  
to cut a smooth edged opening in



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**ARMAMENT**

**WILLARD**  
*Cutting*  
**TOOL HOLDERS**

**FOR AIRCRAFT,**

**AND ACCESSORY PLANTS**

**No Chatter  
No Damaged Work  
No Breaking of Cutters**



**Write Today  
for New Folder**

Spring feature allows  
faster cutting fields  
with heavier cut. Cut-  
ter life is tripled.

Also forming tools  
and tool holders.

## AUTO-ORDNANCE CORPORATION

*Willard Tool Division*

**1437 RAILROAD AVE.**

**BRIDGEPORT, CONN.**

## "HEADED" for profits

Any horizontal milling machine with 3 1/2" bar is "headed" for profits when equipped with the MAXI-CUT Milling Head.

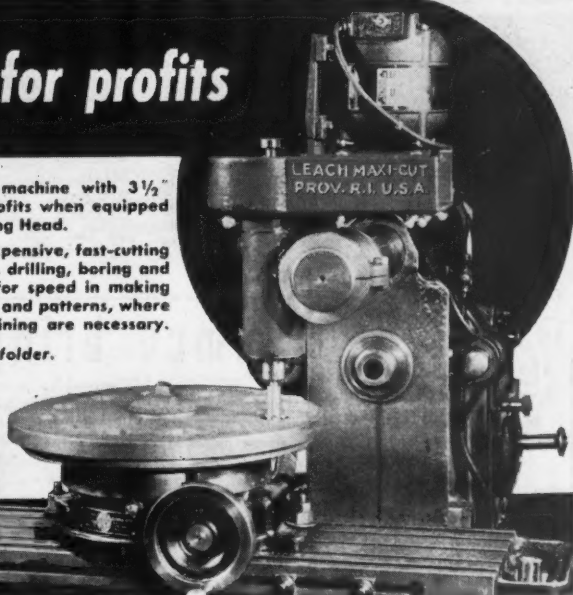
The MAXI-CUT is an inexpensive, fast-cutting milling head for milling, drilling, boring and facing operations . . . for speed in making tools, dies, jigs, fixtures and patterns, where accurate and fast machining are necessary.

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**H. LEACH  
MACHINERY CO.**

**387 CHARLES ST.  
PROVIDENCE, RHODE ISLAND**

*Distributors in Leading Cities*



MODERN MACHINE SHOP 323

May, 1942

straight-chime metal drums up to 35 inches in height. The corrugated cast iron base of the opener can be bolted to the floor. Four steel uprights support the cutting unit, which is counter-balanced for easy adjustment to the height of drum. After adjustment, the cutting unit is locked in position. By closing the cutting unit lever, the drum is perforated.

### Cherry Rivet

A line of rivets designed to solve the problem of blind riveting in aircraft



**The World's Best Rubberized abrasives for Fine Grinding and Polishing**

Attach this advertisement to your card or letterhead. We will send you a free trial sample. Or if you prefer send \$1.00 for Special 33 wheel assortment.

CRATEX MFG. CO., 81 Natoma St., San Francisco, Calif.

### THE PRECISION UNIVERSAL TOOL HEAD



ADJUSTABLE  
While Running!

Absolutely Different

brings all adjustments under absolute micrometric control of the operator without stopping tool or machine. In Jig Borer, Milling Machines or Horizontal Boring Mill, it bores, faces, counterbores, turns outside diameters, mills flat surfaces and slots, undercuts, recesses, back-faces and does an almost limitless range of "headache" jobs. Send for bulletins. Address all communications, inquiries and orders to

**THE PRECISION TOOL CO., INC.**  
P. O. BOX 155, BROOKLYN, NEW YORK  
Cable Address: "Precision New York" Tel: MAin 6-1864

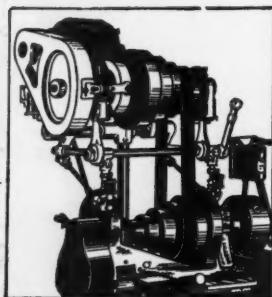
construction is now being marketed by the Cherry Rivet Co., 17 Barranca Ave. Los Angeles, Cal. The Cherry Rivet is of the self-plugging type, with mandrel which has an expanded section and head on the blind side.

In applying the rivet, the expanded section is pulled into a hollow member or shank which expands and forms a tulip head in the back. The rivet can be applied with either a hand-operated or automatic gun, of which several designs are available. The outside end of the rivet breaks off during application and can be trimmed flush with ordinary nippers. According to the manufacturer, aircraft factory tests show that this type of rivet can be applied and trimmed at the rate of 540 an hour by one unskilled operator.

The outstanding feature of the Cherry Rivet is its positive mechanical action. When a pull of 300 to 900 lb., depending on rivet size, has been exerted on the mandrel, there is said to be little doubt as to the type of head formed on the blind side. The force required to apply the rivet breaks the mandrel and accomplishes two highly desirable results; namely, it creates a clinching action, thus holding the sheets firmly together, and expands the shank of the rivet, thereby causing a pressure fit of the shank.

### "Easy" Model "XL" Reciprocating Electric Sander

To meet the grueling service of two and three-shift duty demanded today by defense industries, the Detroit Surfacing Machine Co., 7438 W. Davison, Detroit, Mich., has placed on the market an improved model "Easy" Reciprocating Electric Sander designated as the "XL." In the unit, vibration has been reduced to a minimum through precision bal-



## Remco brings QUIET!

Smooth, quiet, vibrationless power is transmitted by Remco Motor Drives. The motor takes hold by gradually slipping the belt—simple friction clutch action. No noise. Speed changes made without removing tool from cut. No tool marks. Rigid three point suspension, instead of the ordinary one or two points. Drive easily installed, at very low cost. Write! Remco Products Corp., State and Hay Sts., York, Pa.

**REMCO MOTOR DRIVES**  
for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.

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## New Nesting Type Tote Pans



20" long x 12" wide x 6 1/2" deep.  
16 ga., drag holes and handles both ends.

**J. L. LUCAS & SON, INC.**

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## Cut Set-Up Time

75% through use of the  
**New Advance Clamps**  
(the only T-slot clamps)

Clamp directly over  
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**DAVIS  
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will do the  
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quicker  
and  
better?

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**DAVIS KEYSEATER CO.**

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## QUEEN CITY GRINDERS

**Dependable • Efficient  
Economical**

Consider these facts when buying a grinder  
—Queen City Grinders are equipped with  
fully enclosed motors to protect from dust  
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of 1750 R.P.M. are used which do not require  
large diameter wheels in order to secure the  
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return it. We can make reasonable delivery.

**QUEEN CITY MACHINE TOOL COMPANY**

217 EAST SECOND ST.

CINCINNATI, OHIO

May, 1942

MODERN MACHINE SHOP 325



## BORING BAR SET

4 BARS IN CASE  
 $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ "

Price ..... \$6.50  
 BALL POINT  
 WIGGLER ..... \$1.35

Write for circular.

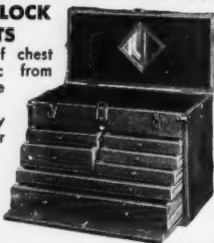


**FLYNN MANUFACTURING CO.**  
 437 BATES  
 DETROIT, MICH.

## For GREATER SAFETY of Valuable Tools Use GS DOUBLE LOCK TOOL CHESTS

The right type of chest  
 for every mechanic from  
 higher grade to more  
 reasonably priced.  
 Before ordering any  
 toolchest write for our  
 literature.

**Geo. Scherr Co.**  
 130 Lafayette St.  
 NEW YORK, N. Y.



## WANTED

Exclusive agencies on a  
 few additional machine  
 tools to complete our  
 line. We are located in  
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 turing district and have  
 been in business for  
 over 35 years.

Write Box 59

## MODERN MACHINE SHOP

431 MAIN STREET,  
 CINCINNATI, OHIO

ancing and the redesigning of handle  
 mountings. An interchangeable front  
 handle which can be shifted from front  
 to side position enables the operator to  
 work into close corners, at right angles,  
 and directly against vertical surfaces.  
 An improved type fan and baffle plate  
 increase the flow of air through the



"Easy" Model "XL" Reciprocating Electric  
 Sander

motor, thus ensuring adequate cooling.  
 The motor, filter, and switch are readily  
 accessible through the use of a new  
 type motor filter cap.

Available with either a 110 or 220-volt  
 motor, the Easy Model XL Reciprocating  
 Electric Sander is designed for use  
 in sanding, rubbing, and polishing metal,  
 plastics, leather, or composition  
 materials.

## Quincy Compressor Selector

Especially designed to aid in selecting  
 the correct size and type of compressor  
 for a specific job in one simple setting,  
 a compressor selector printed in English,  
 Spanish, or Portuguese is announced by  
 the Quincy Compressor Co., Quincy, Ill.  
 The selector functions similar to a slide  
 rule. One setting of the scale shows correct  
 model number, free air delivery, r.p.m., piston  
 displacement, and motor horsepower required.  
 The selector also contains figures for making

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May, 1942

**2 OR 3 DAYS  
DELIVERY ON**

**BAKELITE  
SPUR PINIONS**

**GEARS OF EVERY DESCRIPTION**

**THE GREAVES MACHINE TOOL CO.**  
CINCINNATI, OHIO PHONE, WOODBURN 6312



**DRILL THESE HOLES**

**by a Quick, Easy, Inexpensive Method**  
Your business letterhead will bring literature.  
**WATTS BROS. TOOL WORKS**  
Wilmerding, Pa.

**Friction Drive  
Automatic Reverse  
TAPPERS**

Do your present tappers have a range of work of 1/16" to 3/8" in steel? The Dorman No. 1 Tapper will handle smallest taps in aluminum up to 3/8" in steel or other material. Two other sizes handle taps up to 1" in steel.

**PROMPT DELIVERY  
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Dorman Clutch-Type Friction-Drive Automatic-Reverse Tapper with Self-Centering Chuck. Any standard Morse taper — please specify. Price \$35.00 F.O.B. New York. Satisfaction guaranteed.

**DORMAN MACHINE TOOL WORKS**  
337 CANAL ST. NEW YORK, N. Y.

# Everyone Connected with Metal Cutting and Shaping Knows

**that correct and frequent  
grinding of tools is  
absolutely necessary**



You would never allow a mechanic to use a dull broach or a dull drill. You require that all tools be sharp before using and be ground the moment dullness begins.

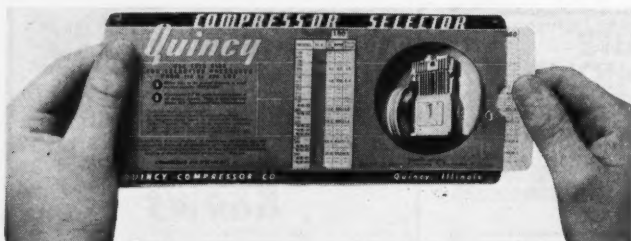
THIS NECESSARY PRACTICE HAS BEEN NEGLECTED IN REGARD TO POWER HACK SAW BLADES. THIS NEW METHOD OF GRINDING BLADES NOT ONLY INCREASES CUTTING EFFICIENCY BUT EFFECTS GREAT SAVING IN BLADES AS WELL.

**Industrial Engineering Co., Inc.**  
141 W. Jackson Blvd.  
CHICAGO ILLINOIS

May, 1942

allowances for loss in free air delivery at high altitudes.

Tests, it is claimed, have proved that the selector is extremely accurate for



Quincy Compressor Selector

both air and water-cooled compressor applications requiring up to 80 cubic feet displacement. Pressures covered by the selector range from 30 to 250 lb.

The Quincy Compressor Selector can be obtained free of charge by writing to the Quincy Compressor Co., Quincy, Ill., specifying whether the selector should be printed in English, Spanish, or Portuguese.



**WADE ENVELOPES**  
protect  
**Shop Orders, Drawings,  
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Made in three styles, transparent, fibre, and metal backs. Non-inflammable acetate windows. Special style or size to order. Write for details.

**WADE INSTRUMENT COMPANY**  
Phone: CEDAR 4728  
1422 E. 109th St., Dept. M., Cleveland, Ohio

## Miccroil

An anti-rust oil to be known as Miccroil has been introduced by the Michigan Chrome & Chemical Co., 6350 E. Jefferson Ave., Detroit, Mich. The material has a high flash point, thus reducing the possibility of fire hazard to a minimum, and dries in 30 to 45 minutes after application. It is light in color, transparent, and, according to the manufacturer, does not alter the ap-

pearance of the part on which it is applied. In addition, the material is said to contain no ingredients which produce a rancid odor.

Miccroil may be applied by hand dipping, and is of a consistency which assures a uniform and extremely effective protective film over the entire surface. It contains 42.5 per cent total solids. Once applied, the material is said to provide constant protection until wiped off or removed with a solvent.

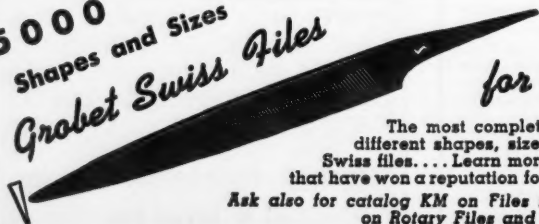
Miccroil can be used on practically any surface which must be protected from oxidation or corrosion. Aircraft parts, gages, precision tools, other machined or polished parts, stampings, and so on, can be protected with the material.

Miccroil is supplied in one and five-gallon containers and 50-gallon drums.

## Cincinnati Milling Calculator

Designed to provide a quick and positive means for selecting the correct cut-

**5000**  
Shapes and Sizes  
*Grobet Swiss Files*



*Write*  
**for Catalog KNA**

The most complete catalog of its kind. Lists 5000 different shapes, sizes and cuts of GROBET Precision Swiss files. . . Learn more about these Chrome Steel Files that have won a reputation for utmost precision and durability. Ask also for catalog KM on Files for Filing Machines; catalog KN on Rotary Files and Diesinkers' Burs.

**GROBET FILE CO. of AMERICA • 3 PARK PLACE NEW YORK CITY**

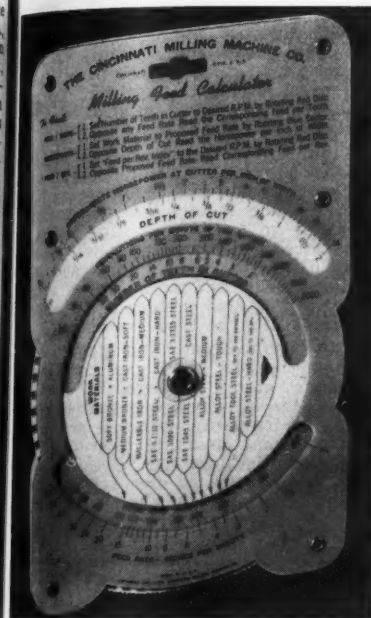


ing speeds and feed rates for many drilling jobs, the handy milling calculator shown in the illustration is now

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Cincinnati Milling Calculator

being offered by The Cincinnati Milling Machine Co., Cincinnati, Ohio. The size and type of cutter, the work material, depth of cut, cutting speed, feed rate, and horsepower required are all calibrated on the dials of the calculator. By properly setting the dials for each particular job, the most effective combina-

tion of speed and feed from the standpoint of power, tooth load and finish can be determined. Complete directions for setting the dials are printed on the calculator, which is available at a price of 50 cents.

## "duMag" Fire-Extinguishing Compound

A dry fire-extinguishing compound designed specifically for extinguishing magnesium and incendiary bomb fires, to be known as "duMag," has been placed on the market by DuGas Engineering Corp., Marinette, Wis. A minimum of the compound is said to be required in extinguishing fires. In addition, the compound is said to be moisture-resistant, remain free-flowing even when stored for long periods, is non-abrasive, and will not react with burning magnesium.

DuMag powder is a blend of various chemicals in correct proportions to give the desired characteristics. It can be applied directly from container to the fire, or to the burning bomb with scoop, shovel, extinguisher, or other mechanical means. According to the manufac-

## T. H. LEWTHWAITE MACHINE CO.

PUNCHES CUTTERS  
BENDERS  
SPECIAL TOOLS



PUNCHES and DIES for round, square and other shaped holes.

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**ROTARY FILES**  
Ground From the Solid



Write  
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The most complete catalog of its kind, illustrating hundreds of rotary files hand cut, milled cut, ground from the solid; also countersinks and diesinks' burs.

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May, 1942

May, 1942

MODERN MACHINE SHOP 329

turer, duMag has been tested and approved by the Factory Mutual Laboratories for fires in magnesium alloys.

DuMag Fire-Extinguishing Compound is available in 45-lb. pails and 12-lb. tubular containers. The quality in the tube is said to have been proved by actual test to be amply sufficient to extinguish the common 2-lb. magnesium-thermit type incendiary bomb.

### Correction

In the April issue of MODERN MACHINE SHOP in the Tools for National Defense section, there appeared an item which stated that E. F. Houghton & Co. has developed a hydraulically-operated rifling machine together with rifling oil. This company, however, does not manufacture the rifling machine but the rifling oil only.

### New Books

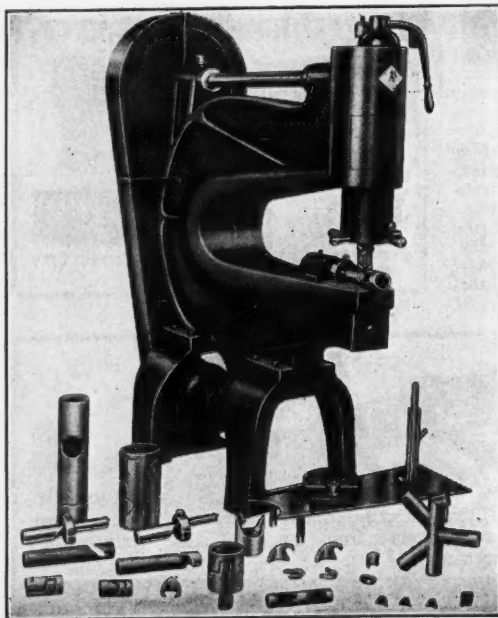
**Dimensional Control.** Published by The Sheffield Corp., Dayton, Ohio. 64 pages, 7 $\frac{1}{4}$  x 10 $\frac{1}{2}$  inches. 82 illustrations. Cloth binding, board covers. Price, \$1.50.

"Dimensional Control" is a textbook on the use of gages in modern industry. The book opens with a resume of the history of standards in gaging and goes into some detail on early English and American Standards, the dawn of interchangeable manufacture, and pioneer American industrialists. An explanation is given on the basic reasons for precision manufacturing, the fundamentals of gaging practices, size comparisons, and types of gages.

Such topics are wear allowances, gage finish, bilateral and unilateral tolerances, and fits and tolerances are discussed. The theory and practice of gage and not go gages and gage blocks are illustrated. A comprehensive explanation of selective assembly and interchangeability and a discussion of gage reading are also included. In addition, magnification devices are shown.

The applications and operations of various gages, such as comparative multiple gages, air gages, fixed size gages, thread gages, thread lead measuring instruments, internal instruments and external checking instruments, are clearly explained. At the rear of the book are tables of fits and tolerances.

Also contained in the book is an insert giving wear allowances and gage



### SAVAGE NIBBLING MACHINE

FOR TUBE SLOTTING AND TUBE SHAPING—FOR FAST AND ACCURATE CUTTING OF FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE.

#### Cutting Capacities

Flat Sheets Mild Steel  $\frac{1}{4}$ "  
Tough Alloys  $\frac{3}{16}$ "

#### Tubing

Wall thickness to  $\frac{1}{8}$ "  
I.D. to 36" O.D.

#### Throat Depth

12" to 36"

Ask for BULLETIN "G"

Showing Tube Cutting Attachments  
and Samples of Work

Manufactured by

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Since 1885

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Pioneer Manufacturers of Nibbling Machines

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modern industry  
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in gaging and  
early English  
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**Accurate Hole Transfer Made Easy With  
NIELSEN TRANSFER SCREWS**



Simply insert in holes,  
invert, strike sharply and  
you have centers and drill  
circles perfectly located.  
Reduce time and eliminate  
spoilage of other methods.  
7 sizes U.S.S. Inexpensive  
—Last for years. Write  
for Circular.

**NIELSEN TOOL &  
DIE COMPANY**  
1863 Gardner Ave.  
Berkley, Mich.

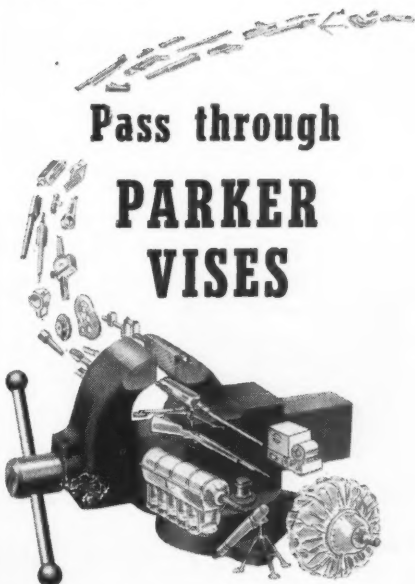
If you are engaged in DEFENSE WORK  
keep in mind **QUALITY HIGH SPEED  
WOODRUFF KEYWAY CUTTERS** for  
service and dependability. Uncondi-  
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**QUALITY TOOL WORKS**  
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Write for Specification  
Sheets and Prices . . .  
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145 Jos. Campau St., Detroit

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DRILL JIG BUSHINGS**

## Millions of Parts for America's War Machine



Millions of parts for America's combat  
equipment and the machinery and tools  
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Parker Vises are in demand today more  
than ever! Our complete resources are  
being devoted to increasing production,  
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quality.

Government regulations require priority  
certificates on tools and equipment. Save  
time by giving your distributor full data  
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pany, Meriden, Conn.

**PARKER VISES**  
AMERICA'S OLDEST

maker's tolerances for plain plug and plain ring inspection gages. The insert also includes gagemaker's tolerances for flush pin and adjustable snap gages.

**Foreman's Policy Manual.** By R. C. Oberdahn. Published by the National Foremen's Institute, Inc., Deep River, Conn. Flexible leather cover, loose-leaf pages. Price, \$6.50.

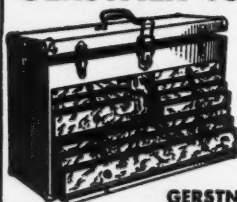
Dedicated to America's industrial supervisors, this manual is worded simply so that each and every type of indi-

vidual who has supervisory responsibilities can understand it. In addition the manual is compiled in such a way that it can be revised from time to time, thus enabling the manual to be kept up to date by making changes as they are made in company policies.

The Foreman's Policy Manual is divided into three sections. The first section consists of material which has long been recognized as basic material in which little or no change takes place. This section is called "The Foreman's Job." The second section is titled "Legislation." This section is divided into several subsections: First, an introduction; Second, Social Security Act in brief; Third, the Wage and Hour Law in brief; Fourth, The Wagner Act in brief; and Fifth, Unemployment Compensation Laws.

The third section of the manual is designated as "Company Policies." The pages in this section are conveniently indexed in alphabetical order and contain outstanding examples taken from several companies' files. Each company intending to issue a manual can make loose-leaf inserts on specific subjects as mentioned to conform to their own company policies.

## GERSTNER Tool Chests



provide adequate, well - arranged drawer space. Constructed of the finest materials, they are recognized as ideal chests for toolmakers and machinists. Free Catalog.

**GERSTNER TOOL CHESTS**

1242 COLUMBIA ST.

DAYTON, OHIO

## Vernon 7" ROTARY TABLE



Precision ground top and bottom—Substantially ribbed. 4 table quadrants calibrated 0 to 90° each. Friction loaded worm dial graduated in 240 minutes. Overall height only 2 3/4". Write for folder!



MACHINERY MANUFACTURING COMPANY

1915 EAST 31st ST. VERNON, ILL. (CHICAGO, ILL. OFFICE)

HORIZONTAL MILLS, VERTICAL MILLS and JIG BOBES, SHAPES and GRINDERS

**1942 Plastics Catalog.** To meet the need for an authoritative, timely, and completely informative source of information on plastics, the Plastic Catalogue Corp., 122 E. 42nd St., New York, N. Y., has published a second edition of the Plastics Catalog, which is available at a price of \$5.00 per copy. More than 600 pages of documented facts, bolstered by charts and informative illustrations, make the Plastics Catalog an invaluable source of information and reference for anyone connected with or interested in the plastics industry.

Divided into 10 sections which treat

## HINGES

VARIOUS WIDTHS  
and GAUGES



BUTTS AND  
CONTINUOUS LENGTHS

WRITE FOR PRICES

**S & S MACHINE WORKS**

4541 W. LAKE STREET HARDWARE DIVISION CHICAGO, ILLINOIS

For  
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CABINETS  
CASES  
BOXES**

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every phase and aspect of plastic development and the plastic industry as of today, the catalog includes an exhaustive treatment of "Plastics in Defense."

In this section is presented a complete story of the role of plastics in the vital business of war and of its positive contributions to America's defenses in the air, on land, and on the sea. The section also includes a competent and informative discussion of the plastics industry as affected by priorities.

The Materials Section comprises approximately 150 pages of concise information compiled by experts and designed to include every new development of any significance in the plastics field. The Plastics Engineering Section contains flow sheets which show at a glance the manufacturing procedure involved in producing each type of material, supplemented by photographs and illustrations, combine to make this section a storehouse of important technical information.

The Machinery and Equipment Section is complete with photographs of every type of press used in the plastics industry and every type of machine, plant equipment, and assembly device figuring in the manufacture or processing of plastics today. The sections on

Laminates and Vulcanized Fibers, Plastic Coatings, and Synthetic Fibers and Rubbers have all been extended to include new developments up to press time.

The now famous Plastics Properties Chart has been revised and amended and is now a self-contained unit of inestimable value to the plastics manufacturer whose many problems may be solved by a reference to this chart. The Solvents and Plasticizers Charts have been brought up to date.

The Index and Directory Section, reflecting the phenomenal growth of the plastics industry during the past year, has been expanded to almost three times its original content. It includes complete lists, alphabetically arranged for quick and easy reference, of all molders, laminators, fabricators; names and addresses of manufacturers; trade names; personnel and equipment, as well as a selected bibliography and a list of educational institutions devoted to plastics.

**Technidata Hand Book** by Edward L. Page, B.Sc. Essential Data on Mathematics, Physics, Chemistry, Engineering, Mechanics. For Engineers, De-

## WESTINGHOUSE welds "down-hand" on C-F POSITIONERS



Welding motor frames for 100 or 125 ton Westinghouse Diesel Electric Locomotives on Cullen-Friestedt Positioner. This means that the heavy, awkward weldment you see in the photograph is being turned 360° and tilted 135° from horizontal to make better "down-hand" welds at all points. It also means faster production because of uninterrupted welding time and safer production because of less handling hazard.

It also means machines for victory more quickly.



● Push-button positioning is described in our circular WP-20. ... Write for it, **CULLEN-FRIESTEDT CO.** 1311 S. KILBOURN AVE. CHICAGO, ILLINOIS



signers, Chemists, Mechanics and Technical Students. Fully Illustrated (8½ x 5½). Published by the Norman W. Henley Publishing Company, 17-19 West 45th Street, New York City. Spiral Binding \$1.00. Cloth Binding \$1.50.

As a student, the author found himself carrying around too many books and spending too much time looking through them for information which often proved to be scattered elsewhere. He compiled for his own use the data contained in this book which in its compactness contains nearly all the essential information needed on these subjects.

This unique book has been written for all who use their knowledge of mathematics, physics, chemistry, mechanics or engineering. It contains the essentials of books on geometry, algebra, trigonometry, calculus, physics, chemistry and mechanical engineering, and is presented in a relatively few well-organized pages.

Facts, figures, theory, definitions, laws, formulas, simple calculations, diagrams and tables are all utilized. Formulas with short explanations of terms have the units and common constants given. Unnecessary data and long explanations have been omitted.

**GEARS**  
**Good Gears Only**  
**All Kinds**  
**Any Quantity**  
**AT THE RIGHT PRICE**  
**THE CINCINNATI GEAR CO.**  
 1825 Reading Road Cincinnati, Ohio

The information is basic and fundamental and will not go out of date.

Volumes of Useful Information are contained within the pages of this book

**Die Designing and Estimating.** Section edition. Published by American Industrial Publishers, 332 Fairmount-Cedar Bldg., Cleveland, Ohio. 160 pages. Cloth binding, board covers. Price, \$3.00 postpaid.

This book contains the text from both "Die Designing" and "Die Estimating," enlarged and completely revised, and several entirely new chapters. The new chapters, including one on Progressive Dies by Ernest Mehwald of Atlantic Tool & Die Co., Inc., and one on Drawing Dies by G. H. Williams of Globe Machine & Stamping Co., and other material by qualified practical men are said to make this edition as useful as it is authoritative.

Practical Points in Die Design and Construction, a check list of procedure, has been compiled with assistance from skilled craftsmen throughout the industry.

Two methods of calculating drawing data—one of which is the method in use in the Small Arms Ammunition Department of Frankford Arsenal—are given. There is also an outline of Equipment and Operations for Manufacture of Small Arms Cartridge Cases based on current prime contractor practice.

The book contains more than a hundred drawings besides Tables of Time Values, photographs, and charts. The material throughout has been arranged for convenient reference use.

### TRADE LITERATURE

"DoAlls on Production" is the title of an attractive plastic-bound catalog now



**Increase Production With**

### CURVE TOOTH CUTTERS

**Woodruff Keyway, Plain Milling**

**Enjoy the Advantages:**

More cutting edge Gives shearing cut  
 Cuts 50% faster Easy to sharpen  
 More cuts per sharpening

**Write for Details.**

**ABER ENGINEERING WORKS, INC., Waterford, Wis.**



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being issued by Continental Machines, Inc., 1306 S. Washington Ave., Minneapolis, Minn., containing a story in pictures of the DoAll Contour Machine for band sawing, band filing, and band polishing. The catalog is divided into nine parts.

Book One describes and illustrates the use of DoAll Contour Machines in plants engaged in the manufacture of various types of guns, airplanes, and other armament. Book Two is devoted to "three dimensional" contour sawing by means of DoAll machines in various plants and factories. Book Three shows and describes the use of DoAlls for producing small quantities of stampings without the aid of dies. In Book Four, special fixtures for handling production jobs on DoAll Contour Machines are shown and their uses on DoAlls in various plants described and illustrated.

Continuous filing operations performed by DoAll machines on various production jobs are illustrated and described in Book Five of the catalog. Book Six treats special work handled by DoAll Contour Machines and Book Seven covers contour sawing operations as performed on DoAlls in numerous plants for the manufacture of jigs and templates, die parts, spring parts, tools and parts for plane production, and so on. Attachments for greater DoAll versatility are illustrated and described in Book Eight, and in Book Nine, the outstanding features of DoAll Contour Machines are treated by means of illustrations.

Copy of catalog is available free of charge to plant engineers planning production and to instructors in vocational, N. Y. A., and defense training programs.

"Protective Concealment." Camouflage for industrial plants, factories, buildings, railroad yards, airfields, conspicuous landmarks and transportation systems are described in a profusely illustrated 68-page booklet titled "Protective Concealment" issued by the Office of Civilian Defense. The booklet was prepared by the War Department under the direction of the Chief of Engineers, U. S. Army, by the Engineer Board, with suggestions of the National Technological Civil Protection Committee.

Accompanied by graphic sketches the booklet describes the technique of precision bombing with charts showing the elements of time necessary for precision bombing and illustrations of the trajectory of the bomb from the time of its



English Sheep Dog

## PORTABLE DUST COLLECTOR

An "Old English Sheep Dog" makes a good "portable dust collector" around the house, but for dust collecting in your factory, machine shop, etc., you need a **TORIT Dust Collector**! These efficient, self-contained units trap dust as it comes off grinding and buffing wheels. Yes—and they're portable too—easily moved wherever needed. **TORIT Dust Collectors** are "guardians" of employee health, "protectors" of vital machinery.

Write today for bulletin giving complete data, prices, and operating features.



**TORIT**  
Mfg. Co.

296 Walnut St.  
St. Paul, Minn.

**TORIT**  
**Dust Collectors**  
SELF-CONTAINED UNITS

release until it strikes the target.

The booklet states that at least five circumstances combine to oppose the bomber and simplify the defender's concealment problem and adds that these are "high altitude, the oblique view required to pick up the target, the brief period available for aligning the bomb sight, the possibility of haze or thick weather, and the obscurity of nightfall."

Although an enemy may have accurate maps and photographs he must rely upon visual identification of the target or a close landmark in order to

properly aim and release the bomb. Any concealment measure that serves to reduce the visibility or confuse the identity of a target may therefore be of considerable value. Accordingly, the booklet describes the modes of attack with emphasis upon such considerations as distance from bases, altitude, speed, visibility and possession of photographs. Included are "Aids to Concealment" such as dummy or decoy installations, the use of smoke and artificial fog such as provided by smudge-pots, and so on.

The final appendix titled "Materials for Protective Concealment" is a catalog of specifications and uses for paints, fabrics, and other items suitable for camouflage.

Distribution of the booklet is restricted. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 25 cents per copy.

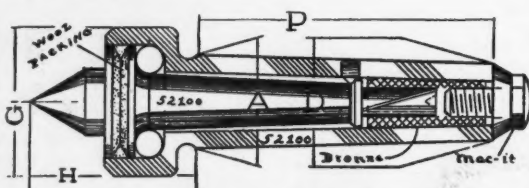
"Double Duty" is the title of a four-page folder issued by the Experimental Tool & Die Co., 12605 Greiner Ave., Detroit, Mich., featuring the Universal Slotmaster, a slotting head which can be adapted to all milling machines for

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use in cutting keyways, templets, splines, internal gears, and for slotting out precision blanking dies or for use wherever sharp corners and special shapes are machined. Copy free upon request.

**Schauer Speed Lathe Catalog.** An attractive, 24-page, 8½ x 11-inch catalog designed to provide readers with a quick apprehension of vital information relative to its Ideal line of speed lathes

has been published by the Schauer Machine Co., 2060 Reading Rd., Cincinnati, Ohio. The line includes chuck type lathes, hand-operated collet type lathes, foot-operated collet, motor and brake type lathes, wheel chuck lathes, foot-operated magnetic clutch and brake

control type lathes, bench and pedestal variable speed lathes, powerful infinitely variable spindle speed lathes, and speed lathes with vacuum type holding fixtures. Special applications for many different finishing, polishing, lapping, and burring operations are illustrated in the catalog. Copy of Catalog No. 420 free upon request.

**Willeys' Bulletin 142.** An eight-page bulletin giving complete tabular and illustrated on Willey's Metals, Standard Tungsten Carbide Tools, and Standard Tool Blanks is now being distributed by Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit, Mich. Willey's Torpedo Type Wheel Dressers and Improved Double End Carbide Tool Grinder are also treated. Copy of Bulletin 142 free upon request.

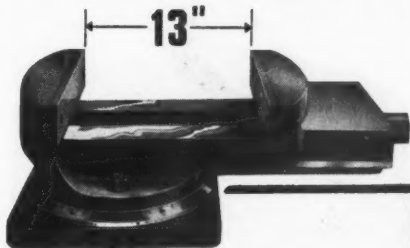
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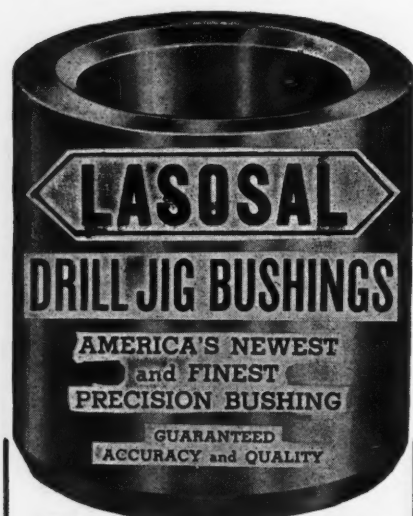
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**"Farrel Marine Gears in Action."**  
Farrel-Birmingham Co., Inc., 381 Vulcan St., Buffalo, N. Y., announces a comprehensive 36-page booklet which describes and illustrates Farrel Marine Reduction Gear Drives now in service on principal types of ships. These include vessels for the U. S. Navy, U. S. Army Engineer Corps, U. S. Coast Guard, U. S. Maritime Commission, and commercial craft such as tugs, trawlers, freighters, tankers, ferries, dredges, and pleasure boats.

The editorial treatment of the booklet is exactly what the name implies,

**"Farrel Marine Gears in Action."**  
Illustrated with each vessel is an installation or factory view of the particular type of reduction gear employed and, in many cases, arrangement drawings show the relationship of the propulsion unit to other engine room equipment. The text is factual in nature, stating various problems peculiar to each different type of service and the solutions to these with reduction gear drive, giving engine speeds, shaft speeds, propeller diameters, pitches, and other interesting data on service operation.

Also included are applications of Farrel Gear Drives with electric couplings, ladder and pump drives for dredges, Gearflex and Manger flexible couplings. Copy of booklet free to men of the marine industry upon request.



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**"Guide to Metal Cutting Efficiency."**  
A 32-page "Guide to Metal Cutting Efficiency" is now being issued by E. C. Atkins & Co., 466 S. Illinois St., Indianapolis, Ind., comprising a comprehensive presentation of Atkins' up-to-date line of metal-cutting saws. The booklet covers circular milling saws, segmental cold saws, power saw blades, hack saw blades, band saws, hole saws, circular metal-cutting saws, and so on. Copy free upon request.

**Vari-Pitch Texrope Sheaves.** How to increase machine flexibility and output with quick, accurate speed-changing is the subject of a 16-page bulletin on Vari-Pitch Texrope Sheaves released by the Allis-Chalmers Mfg. Co., Milwaukee, Wis. In the bulletin, stationary and motion-control sheaves are described, and operating diagrams together with tables giving sizes and dimensions are included. Copy of Bulletin B6082-A free upon request.

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**Atkins Hack Saw and Metal-Cutting Band Saw Blades.** E. C. Atkins & Co., 60 S. Illinois St., Indianapolis, Ind., is now distributing a bulletin giving list prices and specifications of its hack saw and metal-cutting band saw blades.



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As shown in the accompanying illustration, one cover of the bulletin is devoted to a reproduction of the government poster encouraging the purchase of Defense Bonds and Stamps. Copy of bulletin free upon request.

**Trico Bulletins.** Helpful information as to more efficient maintenance, safety of man power, and economical methods of lubricating and protecting industrial and electrical equipment is available through a series of two bulletins prepared by the Trico Fuse Mfg. Co., 2948 N. 5th St., Dept. 1, Milwaukee, Wis.

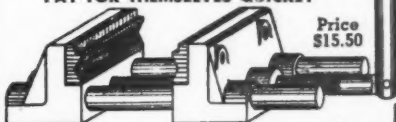
Bulletin No. 4500-C tells how to overcome unnecessary shutdowns due to faulty fusing and poor fuse and clip contact, and how to maintain today's ever increasing production schedules with a decrease in maintenance costs. Bulletin No. 4600-OB illustrates and explains in detail the ways and means for

preventing oil waste, shutdowns of machinery due to improper lubricating, and shows how to save time and effort in maintaining operation of machinery vital to today's production. These bulletins have been prepared in such a way as to be easily inserted into catalogs and are available free upon request.

**Reeves Electric Remote Speed Indicator.** Bulletin No. G-427 illustrating and describing an electric remote speed indicator for use with Reeves variable speed control equipment is now available from the Reeves Pulley Co., Dept. 1P, Columbus, Ind., free upon request.

**"The Aristology Magazine."** The Copperweld Steel Co., Warren, Ohio, announces the publication of a house organ entitled "The Aristology Magazine." Edited by William Feather, it contains the author's interesting comments and observations on topics of the times. Also included is interesting information on Aristology alloy steels and Coppco tool steels. Copy free upon request.

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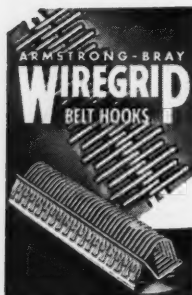
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**Gray Coolant Pumps.** A four-page folder illustrating and describing Gray Portable Controlled - Flow Coolant Pumps for use with drill presses, lathes, grinders, saws, tappers, milling machines, and other equipment, together with "Flo-Bac" Coolant Pans and Fittings, is now being issued by the Gray-Mills Co., Inc., 217 W. Ontario St., Chicago, Ill. Copy free upon request.

**"Belts for the Textile Industry"** is the title of a 36-page catalog issued by the L. H. Gilmer Co., Tacony, Philadelphia, Pa. Illustrated in two colors, the catalog classifies the belt drives of four principal textile industries—Cotton; Silk and Synthetic; Wool; Jute, Hemp and Flax. Within each industry, the drives are further divided into the several major applications, and the belt or belts which are recommended are described, with full specifications given.

The catalog also contains complete listings on V-belts and connected V-belt, and Kable Kord Flat Belts and Belting. Convenient engineering tables and useful formulas are also included. Copy of catalog free upon request.



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**Cratex Rubberized Abrasive Wheels and Points** for fine grinding and polishing are the subject of a four-page illustrated and descriptive folder prepared by the Cratex Mfg. Co., 81 N. Santa Ana St., San Francisco, Cal. Copy free upon request.

**Henry & Wright Dieing Machines** for stamping and punching operations are the subject of a 34-page catalog prepared by The Henry & Wright Mfg. Co., Hartford, Conn. The catalog covers the outstanding features of the Henry & Wright Dieing Machine, the types available which include 10, 25, 50, 60, 75, 100 and 150-ton units, specifications, applications, and so on, as well as various equipment for use with the dieing machine, including special automatic feeding adjustable scrap cutters, stacking chutes, automatic power straighteners, automatic reels, and so on. Copy free to mechanical executives upon request.

**Guide for Fastening Users.** The H. M. Harper Co., 2620 Fletcher St., Chicago, Ill., is now offering to users of fastenings a handy guide to specifying and purchasing non-ferrous and stainless steel bolts, nuts, screws, rivets, washers, and accessories. This 1942 reference book and catalog is devoted entirely to fastenings of brass, bronze, Everdur, Monel Metal, and stainless steel. It contains numerous tables of weights, chemical properties, mechanical properties, and standard dimensions.

The book lists and describes approximately 4,320 items carried in stock. It also describes numerous special fastenings which can be manufactured to order. The book is attractively printed in four colors so as to give the various alloys a natural appearance. It is 6 x 9 inches in size, contains 80 pages, and has a rugged, durable cover.

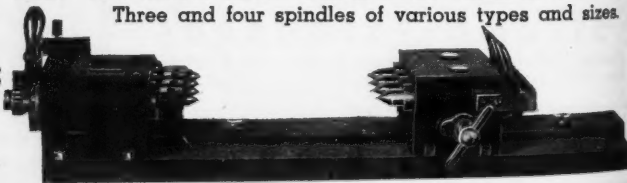
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"Improved Processing" is the title of a series of booklets now being published by The Selas Co., Philadelphia, Pa., designed to define the advances which can be made in industrial process heating through the research approach.

Number 4 of the series describes a radically different heating technique—controllable direct radiant heating with gas—widely demonstrating its usefulness at process improvement. To show how extensively a single industry can adapt such a fundamental technique, 18 varied installations in the metals and metal products field are cited. The further versatility of the technique is indicated by noteworthy applications in the chemical, ceramic, textile, and building-materials industries. Copy of booklet free upon request.

G-E Electric Heaters and Heating Devices. Catalog GED-650B is issued by the General Electric Co., Schenectady, N. Y., lists a complete line of G-E Electric Heaters, Heating Devices, and Heat Control Equipment. Each item in the line is pictured and many are accompanied by a list of applications as well as by installation and operation data.

Many photographs show interesting jobs being done by electric heaters in industry. Information useful in calculating power requirements, a tabulated list of uses for G-E Electric Furnaces, and a list of G-E industrial heating publi-

cations round out the catalog, copy of which is available free upon request.

**Stanley Electric Tools.** The Stanley Electric Tool Division, The Stanley Works, New Britain, Conn., is now distributing a 52-page catalog, designated as the No. 67, covering its line of electric tools. Described and illustrated are portable electric drills, portable electric grinders, pedestal, bench, contour, tool-room, and flexible shaft grinders, port-

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able electric polishers, portable electric sanders, portable electric screw drivers, portable electric saws, portable electric shears, and shearing machines. Attachments and accessories for the various tools and machines are also shown and described. Copy of Catalog No. 67 free upon request.

**GEMCO Multi - Purpose Crank Shapers**, plain, production, and universal types, are covered as to features, construction, specifications, dimensions, and so on, in a 16-page illustrated catalog now being issued by General Engineering & Mfg. Co., St. Louis, Mo. Copy of Catalog GC-11 free upon request.

**"Nitralloy and the Nitriding Process,"** a 40-page data book has been issued by The Nitralloy Corp., 230 Park Ave., New York, N. Y. Embodied in the book by Dr. V. O. Homerberg, Technical Director of the Corporation, are tables, charts, and data covering the composition of nitriding steels, preliminary treatment, physical properties, the Nitriding Process, properties of nitrided

Nitralloy, and a complete section on the Machining of Nitriding Steels by W. J. Hargest, American Machinist. A useful bibliography and list of applications conclude the book, copy of which is available free upon request.

**Aircraft Tools Catalog.** Aircraft Tools, Inc., Los Angeles, Cal., has issued a catalog covering a complete line of small tools for aircraft construction and maintenance. The line includes all types of riveting sets, angle drills, hand rivet squeezers, speed wrenches, hole saws, duplicating punches, cable splitters, and bucking bars. New tools covered include stop countersink with ball bearing design, Wedge-Lock sheet holders, hook scrapers for burring sheet stock, chip chasers for cleaning seams between sheets, and plastic-headed hammers. Copy of catalog free upon request.

**"How to Get More Gallons at Less Cost"** is the title of a 36-page bulletin issued by the Allis-Chalmers Mfg. Co., Milwaukee, Wis., containing complete engineering data on Allis-Chalmers Electrifugetal and SS Unit Centrifugal Pumps. Head capacity tables and dimension charts are provided in the bulletin to facilitate the selection of proper pumps for individual applications. Performance data and engineering recommendations, also a part of the bulletin, are additional aids in the selection of units. Cross section drawings showing construction details of pumps are also included.

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industry, many of these varied applications being illustrated in the bulletin. Copy of Bulletin B6018-B free upon request.

**Quickwork-Whiting Stamping Trimmer.** Illustrated, descriptive, and specific information on the Quickwork-Whiting Stamping Trimmer for trimming, forming, beading, and flanging large or small stampings in straight line production or job shop work is contained in a four-page bulletin released by the Quickwork-Whiting Division, Whiting Corp., Harvey, Ill. Copy of Bulletin QW-107 free upon request.

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**"The Di-Acro System of Metal Duplicating Without Dies"** — an original process for duplicate forming of parts or pieces to die accuracy using Di-Acro precision machines, individually and in connection with each other—is the subject of a 32-page catalog prepared by the O'Neil-Irwin Mfg. Co., Minneapolis, Minn. Treated in the catalog are the development of the Di-Acro system, the Di-Acro Bender No. 1, Di-Acro Brake No. 1, and Di-Acro Shear No. 1 and parts made with each, Di-Acro Bender No. 2, Di-Acro Brake No. 2, applications of Di-Acro machines by companies, typical users of Di-Acro machines, questions and answers about Di-Acro units, and so on. Copy of catalog free upon request.

**Grinders' Instruction Cards.** Designed for precision grinder operators, instruction cards containing important information on precision dressing are now available free of charge from the Diamond Tool Co., 934 E. 41st St., Chicago, Illinois.

**Atlas Platform Trucks** is the subject of a four-page bulletin, designated as the No. 1261, which has been prepared by The Atlas Car & Mfg. Co., 1100 Ivanhoe Rd., Cleveland, Ohio. Construction features, specifications, applications,

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and so on, are given in the bulletin, copy of which is available free upon request.

**Durable Punch & Die Reference Book.** Durable Punch & Die Co., 308 N. Loomis St., is now issuing a reference book dedicated to the profession of mechanical and tool engineers and showing a few of the different constructions in which Durable Patent Piercing Punches are being used with satisfactory results. Copy free upon request.

**Hannifin Air Pressure Regulating Valve** for efficient operation of pneumatic presses, riveters, air chucks, spray painting equipment, pneumatic cylinders, and similar equipment, is described and illustrated in a four-page bulletin released by the Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago, Ill. Copy of Bulletin No. 56 free upon request.

G-E Motors for aircraft service is the subject of a four-page bulletin announced by the General Electric Co.,

Schenectady, N. J. Shown and described in the bulletin are standard motors for the operation of cowl flaps, coolers, antenna reels, fuel pumps, hoists, and other aircraft equipment. Copy of Bulletin GEA-3674 free upon request.

**"Cleveland Tramrail Engineering and Application Data"** is a 12-page illustrated and informative catalog published by the Cleveland Tramrail Division, The Cleveland Crane & Engineering Co., 111 E. 283rd St., Wickliffe, Ohio. The catalog covers much of the large subject of overhead materials handling. Copy of Catalog No. 2008-A free upon request.

**"Aero-Thread" Specification Sheet No. 234.** Aircraft Screw Products Co., Inc., 47-23 35th St., Long Island City, N. Y., is now issuing a four-page folder giving specifications of the "Aero-Thread" Screw Thread System, which is now widely used to strengthen threaded fastenings in aluminum alloys and other light metals used in high speed aircraft engines. Copy of Specification Sheet No. 234 free upon request.

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**"Hobart Arc Welding News."** An arc welding news magazine entitled "Hobart Arc Welding News" is now being published by Hobart Brothers Co., Troy, Ohio. This interesting publication will be sent free of charge to anyone writing to the company's Direct Mail department and asking to be placed on the regular magazine mailing list. Editorial matter is made up from entries in the Hobart Arc Welding News Contest, letters to the editor, and articles by welding experts.

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U. S. Multi-Millers is the subject of a 12-page bulletin prepared by the U. S. Tool Co., Inc., Ampere (East Orange), N. J., covering features of design, special applications, construction, specifications, and so on. Copy of Bulletin No. 60 free upon request.

Gilmer Special Purpose Belts. Designated as the No. 360, a 32-page illustrated catalog on special purpose belts for power transmission drives has been announced by the L. H. Gilmer Co.,

Tacony, Philadelphia, Pa. The catalog describes for special applications which involve factors such as high speeds, close precision, shock loads, double friction surface, very light duty, and so on.

Numerous belt specifications are given for grinders, drill presses, lathes, sanders, printing and binding machinery. Static control belts are described. Multiple and frictional horsepower V-belts, connected-type V-belt, endless round belts, and endless cord flat belts are fully listed, together with useful engineering data. Copy of Catalog No. 360 free upon request.

"Produce with Safety" is the title of a four-page folder published by the Strand Mfg. Co., Inc., 158 N. Desplaines St., Chicago, Ill., illustrating and describing Strand Enclosure Safeguards

for use on punch presses in blanking, notching, and so on. Copy free upon request.

Quickwork-Whiting Metalworking Machinery. Bulletin QW-106 illustrating and describing Quickwork-Whiting Rotary Shears and Attachments, Throatless Shears, Power Hammers, and Stamping Trimmers is now being distributed by the Quickwork-Whiting Division, Whiting Corp., Harvey, Ill. Copy free upon request.

# Douglas

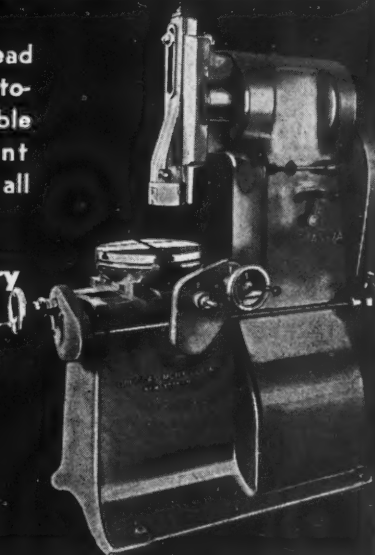
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## 1. Metal Cutting Hand-Book

A new 72-page hand-book on metal cutting methods has been issued by Simonds Saw and Steel Co., Fitchburg, Massachusetts.

## 2. Shapers

General Engineering and Mfg. Co., St. Louis, Mo., has available Bulletin GC-12, featuring GEMCO Multipurpose crank shapers.

## 3. Milling Vise

Bulletin V-100 illustrating and describing the Hartford four-point milling vise may be obtained from The Hartford Special Machinery Co., Hartford, Connecticut.

## 4. Multi-Millers

Bulletin No. 60, issued by U. S. Tool Co., Inc., Ampere, N. J., illustrates and describes U. S. Multi-Millers.

## 5. Superfinishing Stones

Mid-West Abrasive Co., Detroit, Mich., has issued bulletin featuring micro bond superfinishing stones for precision in metal finishing.

## 6. Acousti-Booths

Burgess Battery Co., Acoustic Division, 500 W. Huron St., Chicago, Ill., has issued bulletin illustrating and describing the Burgess Acousti-Booth for improving telephone conditions in noisy shops.

## 7. Selection of Grinding Wheels

"Facts About and Selection of Grinding Wheels and Other Abrasive Shapes" is the title of a 64-page book issued by Bay State Abrasive Products Co., Westboro, Mass.

## 8. Hardness Tester

Clark Instrument, Inc., 10204 Ford Rd., Dearborn, Mich., has issued literature describing the Clark Hardness Tester.

## 9. Hydraulic Rigidmil

Bulletin No. 0-1 illustrating and describing the use, features, possible cycles and specifications of the Sundstrand No. 0 Hydraulic Rigidmil has been issued by Sundstrand Machine Tool Co., Rockford, Illinois.

## 10. Aircraft Tools

Aircraft Tools, Inc., Los Angeles, Cal., has issued new catalog featuring tools for aircraft construction and maintenance. Among new tools illustrated are the stop countersink with ball-bearing design, wedge-lock sheet holders, hook scrapers for burring sheet stock, chip chasers for cleaning seams between sheets, and plastic headed hammers.

## 11. Flame Hardener

The Fellows Gear Shaper Co., 70 River St., Springfield, Vt., is offering a new 12-page illustrated bulletin describing the machine and operating routine details in connection with the use of the Fellows Flame Hardener.

## 12. Motors

Bulletin MU-182 available from the Wagner Electric Co., 6400 Plymouth Ave., St. Louis, Mo., gives complete technical data and information on the Wagner Polyphase motors which are particularly adaptable to machine tools.

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### 13. Grinding

The third edition of "Wet-Dry Belt Grinding in the Spotlight" telling where, when and how to use this new machining method is available from the Porter Cable Machine Co., 300-3 Wolf St., Syracuse, N. Y.

### 14. Radial Drill

The Cincinnati Bickford Tool Co., Cincinnati, Ohio, has issued Bulletin R-21A listing all features and giving complete details of the Cincinnati Bickford Super Service Radial Drill.

### 15. Collets

A complete line and description of Hardinge collets is available in new Bulletin No. 41 issued by the Hardinge Brothers, Inc., Elmira, N. Y.

### 16. Valves

Detailed description of standard sizes of air pressure regulating valves is available in Bulletin 56MM issued by the Hannifin Manufacturing Co., 621 South Kolmar Ave., Chicago, Illinois.

### 17. Dust Control System

Complete information on the design and installation of a Roto-Clone dust control system is available from the American Air Filter Co., Inc., 100 Central Ave., Louisville, Ky. Write for Bulletin No. 272.

### 18. Air Compressor

A 28-page booklet "How Air Is Being Used in Your Industry" gives complete information on Curtis air operated equipment and is being offered by the Curtis Manufacturing Co., 1913 Kienlen Ave., St. Louis, Mo.

### 19. Pneumatic Tools

The Cleveland Pneumatic Tool Co., 3734 East 78th St., Cleveland, Ohio, has issued Bulletin 85 illustrating and describing the complete line of Cleco Small Riveters. The bulletin also contains useful specifications and charts.

### 20. Drives

Bulletin describing complete line of Berkeley drive attachments is available from the Berkeley Equipment Company, Corry, Pennsylvania.

### 21. Metal Saw Sharpener

Detailed description on the Wardwell Metal Saw Sharpener is given in folder 57T now being offered by the Wardwell Manufacturing Co., 3165 Fulton Rd., Cleveland, Ohio.

### 22. Oil Extractors

Information and specifications on all sizes of American Oil Extractors are contained in folder A-381 issued by The American Laundry Machinery Co., Cincinnati, Ohio.

### 23. Couplings

A detailed description of Kanti-Lever Couplings can be secured in Bulletin 28-M by writing to the Brown Engineering Co., 120 N. Third St., Reading, Pennsylvania.

### 24. Stamping Tools

Circular giving prices and detailed description of Cunningham metal stamps is available from the M. E. Cunningham Co., 158 E. Carson St., Pittsburgh, Pa.

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**Norton 6-Inch and 10-Inch Type C Cylindrical Grinders** for plunge cut and traverse jobs are the subject of an interesting illustrated and descriptive folder released by the Norton Company, Worcester, Mass. Copy free.

**Atlantic Metal-Cutting Band Saws.** Illustrated, descriptive, and tabular information on Atlantic Metal-Cutting Band Saws is contained in a 16-page booklet published by the Atlantic Saw Mfg. Co., Inc., New Haven, Conn. Copy free upon request.

**Atlas Three-Wheel Tractors.** Bulletin 1282 presenting features, illustrations, specifications, and so on, on Atlas Three-Wheel Tractors for materials handling, especially in congested areas, is now available from The Atlas Car & Mfg. Co., 1100 Ivanhoe Rd., Cleveland, Ohio, upon request.

**"Characteristics of Rezilal Stainless Steels"** is the title of a data sheet now being issued by the Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y., presenting in tabular form the important information necessary in specifying or using the leading stainless steel grades. Copy free.



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**Johnson Universal Bronze Bars.** Complete tabular, illustrated, and descriptive information on Johnson Universal Bronze Bars is contained in a four-page bulletin announced by the Johnson Bronze Co., 590 S. Mill St., New Castle, Pa. Copy free upon request.

**Sundstrand No. 0 Hydraulic Rigidmill.** The Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill., has prepared an eight-page illustrated bulletin covering the use, features, possible cycles, and specifications of the Sundstrand No. 0 Hydraulic Rigidmill. Copy free upon request.

**Manual Auto-Starters.** A four-page leaflet describing manual auto-starters for low voltage starting of non-reversing, squirrel cage, two and three phase, 5 to 200 h.p. induction motors is announced by the Westinghouse Electric & Mfg. Co. Two-step operation with protection against low voltage overload and incorrect sequence is discussed. Interlocked starting sequence and automatic return to "off" position are described, with a note on rolling contacts and bimetal relays.

The leaflet is well illustrated with wiring diagrams and close-up views of principal parts. A table lists recommended starter sizes for common horsepower and voltage ratings of motors used on 25, 40, 50, and 60-cycle circuits.

A copy of Descriptive Data 10-700 may be obtained from Dept. 7-N-20, Westinghouse Electric & Mfg., East Pittsburgh, Pennsylvania.



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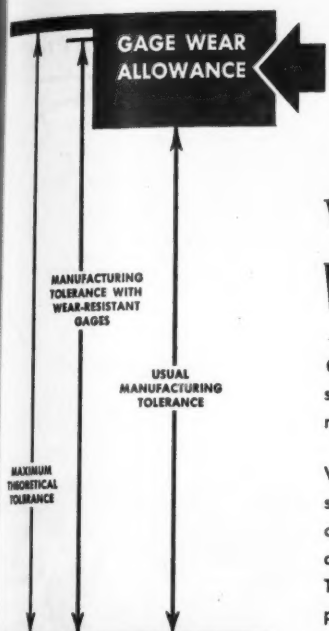
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Eclipse Seamless Flexible Metal Hose. Bulletin H-201-1935 covering a complete line of Eclipse Seamless Flexible Metal Hose for automotive, aviation, marine, manufacturing, mining, power generation, plastic, and tenting applications is now available from the Bendix Aviation Corp., Philadelphia Division, Philadelphia, Pa., free upon request.

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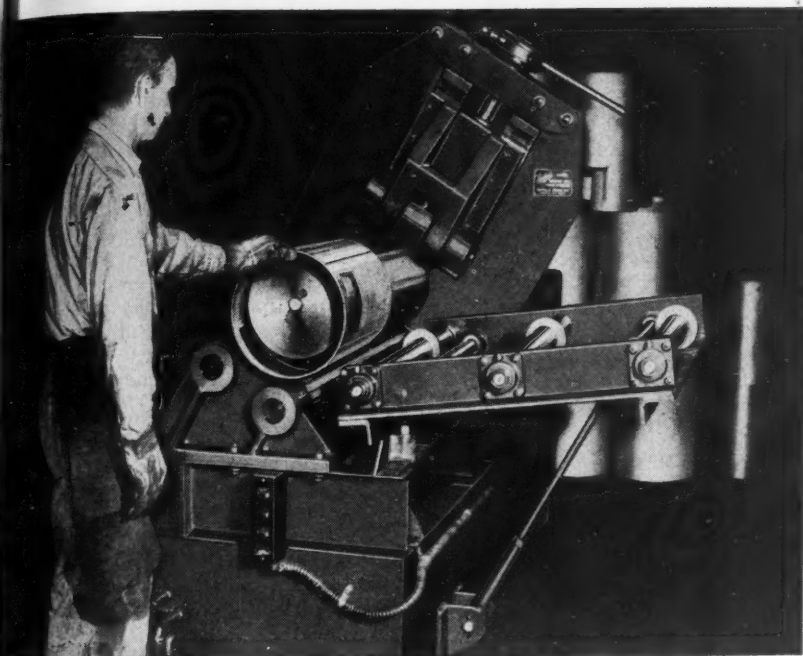
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# BENDING ROLLS

# THE LAST WORD . . .

**I**N future issues the editor's comments on current affairs as they affect the metal manufacturing industries will appear on this page instead of the page under the heading "Over the Editor's Desk" as heretofore.

In previous months the editor has been at some slight disadvantage due to the fact that, whereas some ten days elapses between the closing of the first form (in which his page has previously appeared) and the closing of the last form, too much can happen between the time the first form goes to press and the time that the magazine is placed in the hands of the reader.

The future liberty and freedom of the American people is dependent upon the speed with which we can produce airplanes, guns, tanks, and ships—all products of the metal manufacturing industries—and in these days when events are following each other so swiftly that the national situation can change in a few hours it is imperative that any comments must be based upon the latest information. So in the future the editor will have the "last word" before the last form goes to press.

**T**HE situation in the next two or three months will be critical. Given an even start, the United States could out-produce the Axis nations single-handed, but, as Floyd Odium has said, we did not start even. This country was reluctant to leave the ways of peace. For nearly a decade, while Germany and Japan were arming to the teeth, we went blandly on producing accessories for comfortable living.

Germany has a national income of around 40 billions a year. Last year the

Nazis produced 25 to 27 billions of dollars worth of war supplies. The United States has a national income of nearly 100 billions, yet we produced only 15 billions of dollars worth of war materials for ourselves and our allies.

The total Axis war production last year was something like 45 billions; which was about as much as Great Britain, Russia, and the United States produced together. But the United Nations cannot begin to win this war merely by matching Axis production; if we cannot top the Axis effort by a wide margin, we stand to lose.

Hitler has been utterly ruthless in his shifting of plants, machinery, and workers. He has merged the machinery and workers of 20,000 small factories into a few large plants and his ruthless mobilization has given him a vast accumulation of tanks, guns, and planes. Japan, too, has been building war materials for the past several years. Rationing began in Japan as far back as 1938.

Everywhere our forces are fighting a defensive, delaying action, fighting to stave off too many defeats before we can get our war industries going at top speed. Our President has called for 60,000 planes, 45,000 tanks, 20,000 anti-aircraft guns, and 8 million tons of shipping this year. This is the biggest production job in history—a job that only the greatest industrial nation on Earth could do.

But we can't sit smugly back and talk about what we can do while our enemies are producing at top speed. It will be time enough to talk about what we can do after we have done it.

Remember that the tortoise won the race while the hare was dreaming about what he could do.



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